



FRIDAY, MARCH 14.

Contributions.

Cantilever Bridges.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The paper read by Carl Gayler before the Engineers' Club, St. Louis, Jan. 13, 1884, on "Cantilever Bridges," as reported in your issue of last week, is so full of ambiguity that it is a difficult matter to understand what is really meant to be conveyed. If it desired to convey the idea of an entire success of the principle in the construction of the Niagara Bridge, I fear that many will fail to see it.

I cannot agree with the statement that a cantilever bridge is a suspension bridge so designed that a strain on the anchorage is only vertical, and that the horizontal component of the pull of the cables or links, or principal tensile members generally, is resisted by a compression member or strut which forms part of the superstructure. There is a wide difference between the two, both in the manner of their construction and application as a viaduct; it is one of the many different mechanical appliances for bridging a chasm, or otherwise, when false works are impracticable.

The compression member or strut referred to is the bottom chord of the truss, whose centre rests on the pier, and extending from the anchorage to the centre of the middle span or the ends of the truss, leaving a gap to be filled by another truss.

Mr. Gayler states that "compared with the suspension bridge proper, there is a gain in stiffness against moving loads; the system is stiff, and the strains can be ascertained as easily and accurately as in a truss." Just so; what is it but a truss?

He states that the changes of the temperature, its expansion and contraction, are provided for at the anchorage and toward the centre of the middle span. The provision is too loose and is the cause of too great deflection, one of the principal objections to the cantilever principle.

The remaining clauses of the paper do not appear to throw any new light upon the subject, but the three last place Mr. Gayler on both sides, *pro* and *con*.

In conclusion, I still think that another design would be equally suitable for the same position, both in regard to strength and economy.

March 10, 1884.

Cornwall, Orange Co., N. Y.

The Proposed Uniform Code of Signals.

INDIANAPOLIS, IND., Feb. 29, 1884.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The communications in your columns from Mr. Edwin A. Hill, on the subject of uniform signals, have been so admirable that I am surprised at the point which he raises in the issue of Feb. 22, in regard to using red as a signal for trains following.

On page 5 of the report of the committee, under the caption, "Stationary and Fixed Signals," they say: "The principal use of such signals is to indicate either 'danger,' 'stop'—red, 'caution, proceed with care'—green, etc., etc. Again, 'The effort of the committee has been directed to make red a signal of danger only, and to be used for no other purpose than to bring trains to a full stop.'" On page 6 we find the following: "Danger signals for rear protection should be displayed in an elevated position, to the rear only, and never shown when the train is not on the main track." This provision was evidently made to prevent the necessity of trains running by danger signals when they passed other trains on sidings.

It occurs to me that the principle advocated in these quotations is a very wise one. There should be some signal meaning "stop," past which no train may proceed. Such a signal would be seen comparatively so seldom that its sight would be startling, and immediate attention would be guaranteed; whereas, if in some cases it were allowable to pass it, this powerful effect would be lost and trains would not check until they had approached near enough to see whether or not it really did mean "stop."

The signal carried to indicate a following train does not uniformly bring opposing trains to a full stop, and in some cases should not even cause them to reduce speed. If the train carrying the signal has the "right of road" over the train observing them, the latter is on the siding and remains there; but if the train carrying them is inferior to the train observing them, then the latter train proceeds without stopping, and observes the signal only as a caution to expect the signalled train at some station beyond.

This signal, then, is not one of danger, requiring a full stop, but is merely one of caution, notifying opposing trains to observe that the schedule is not yet filled. The green, recommended by the committee, is therefore the proper color. Mr. Hill is in error in regard to the practice on the Pennsylvania Railroad. That road has used this color for at least 10 years.

The suggestion that signals for a train following be carried both on the engine and at the rear of the train, is open to some objections. The committee recommended that "danger signals" be displayed to the rear of every train, while on the main track, and that the rear of every train carry markers. It will not do to make the red signal shown to the rear the marker, in addition to its duty as a protector,

because it frequently becomes necessary to place a red signal on the rear of the front end of a train broken in two, while the rear portion is probably a mile or more behind. It is, therefore, necessary to use both combined—red and green—on the rear of every intact train, showing red to the rear and green to the front and side, and as soon as the train clears the main track the signal lights should be turned so as to obscure the red and show the green to the rear as well as to the side and front. To carry classification signals at this point, therefore, would necessitate duplicating colors already displayed, and unless some definite location was assigned to each confusion would follow. If the rear of every train were to be occupied by a caboose, or one of the company's own coaches, these positions might possibly be arranged; otherwise not.

Signals properly displayed on the engine can always be seen, and there is no more necessity for doubling this signal than for any other of the hundreds daily used.

Calculating Ordinates to Short Chords.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Many thanks to the *Gazette* and to Mr. Berg for his paper in your issue of Jan. 11, on "Distribution of Material," which embodies many useful points.

The table of ordinates, in the issue of Jan. 18, recalls my intention of sending you a simple and easy rule for calculating ordinates to chords of 100 ft. or less. I have never noticed its publication. Trial will show that it is sufficiently exact for most, if not all, ordinary railroad purposes, down to curves as sharp as 10° or 12°, and for setting out intermediates in staking out on even sharper degrees.

The rule is: Divide the product of the segments of the chord (or of distances from ordinate point to ends of arc) by the diameter of curve.

It is obviously based on the theorem that the products of the segments of two intersecting chords are equal to each other, neglecting relatively immaterial parts. The approximation for 12° curve is as close as .006 ft. The formula or rule I found on the fly-leaf of an old field-book, my attention being called to it by a friend. I think some of our juniors may find this a little useful occasionally, but its publication is submitted entirely to your judgment.

[The rule given above is correct enough and ingenious enough to serve as a mathematical curiosity; but of what use is such a rule for railroad work? Let any one master these two or three simple facts, which are easy enough to remember, and he can have as many ordinates as he wishes, off-hand, for any curve, without computation or table:

1. The middle ordinate of a 1° curve, for a chord 100 ft. long, is 0.22 of a foot (or 0.218, more exactly, if any one cares to remember it).

2. For the same chord on any other curve multiply 0.22 by the degree of the curve.

3. For a longer or shorter chord than 100 ft. the middle ordinate is in proportion to the square of the number of stations (of 100 ft.) in the arc. For an arc 200 or 300 ft. long it is 4 and 9 times greater, respectively. For an arc 50 ft. long it is one-fourth as great. For an arc 25 ft. long, one-fourth as great as for 50 ft., or one-sixteenth as great as for 100 ft.

Or, by formula, the middle ordinate, O , for any arc n stations long, on any curve of D° , is,

$$O = 0.22 n^2 D.$$

4. Ordinates at quarter-points are three-fourths of the middle ordinate.

All this can be fixed in the memory once for all, and for what more is there any use in railroad work?—EDITOR RAILROAD GAZETTE.]

Elevation of Outer Rail—Facts Favoring High Elevation.

EAST INDIA, Jan. 7, 1884.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I would like to hear the opinions of some experienced practical men on the above subject.

Many railways use Molesworth's formula, which is the same as that given by Messrs. Huntington and Latimer in "The Road-Master's Assistant," viz.:

$$\frac{V^2}{R} \times G$$

(3/4 in. per degree at 33 miles per hour.—EDITOR.)

In my opinion a better formula for speeds from 15 to 30 miles per hour is:

$$\frac{V^2}{R}$$

(3/4 in. per degree at 33 miles per hour.—EDITOR.)

And even this does not give sufficient elevation for low speeds, 8 to 14 miles per hour, on sharp curves.

Couche in his treatise on permanent way mentions a case where the greatest speed was 33 miles per hour and the elevation 1 3/4 in. The inspector or section master noticed that the wheels ground against the rails a great deal, and increased the elevation to 2 3/4 in., a rate suitable for a speed of 48 miles per hour; after which trains ran easier, and the rails, etc., lasted longer.

I give a case in point, and could give many more, viz.: Gauge, 5 ft. 6 in.; radius of curve, 800 ft. 6 in. (7° 10' curve.) Greatest velocity, 15 miles per hour; least velocity, 5 miles per hour.

This curve had the outer rail elevated 2 3/4 in. and was laid to exact gauge with fir sleepers (on most Indian railways no

extra width is allowed in curves). In three months the gauge had widened 1/4 in. and the rails and ties were much damaged. The elevation was increased to 3 3/4 in., and still the line could not be kept in gauge. Then 4 3/4 in. was tried, and eventually 5 in., after which no trouble was experienced, and the rails have now kept correct gauge for four years, and wear well.

Some contend that if the outer rail be elevated too much, trains will run off on the inner side of the curve. Are there any properly authenticated proofs of this having occurred? I have had nearly 20 years experience on permanent way and have never known it happen; but I have known cases where a curve should, for a speed of 30 miles per hour have had 2 3/4 in. elevation, but owing to the sudden sinking of a new embankment it has been 4 in. to 5 in. and even 6 in. Trains ran over this curve at speeds varying from 5 to 35 miles per hour for nearly a month, but no accident occurred.

On a double line I have often seen straight portions of the road where the outer rail was 1 3/4 in. to 2 in. lower than the inner rail for months together.

It is also stated that too much elevation causes a train to pull heavier. I would like to see some proof of this before accepting it as a fact. My experience, both as regards smooth running and haulage, is that 1 in. or 1 1/4 in. too much is better than 1/2 in. too little.

Hoping to hear the opinions of some of your readers,

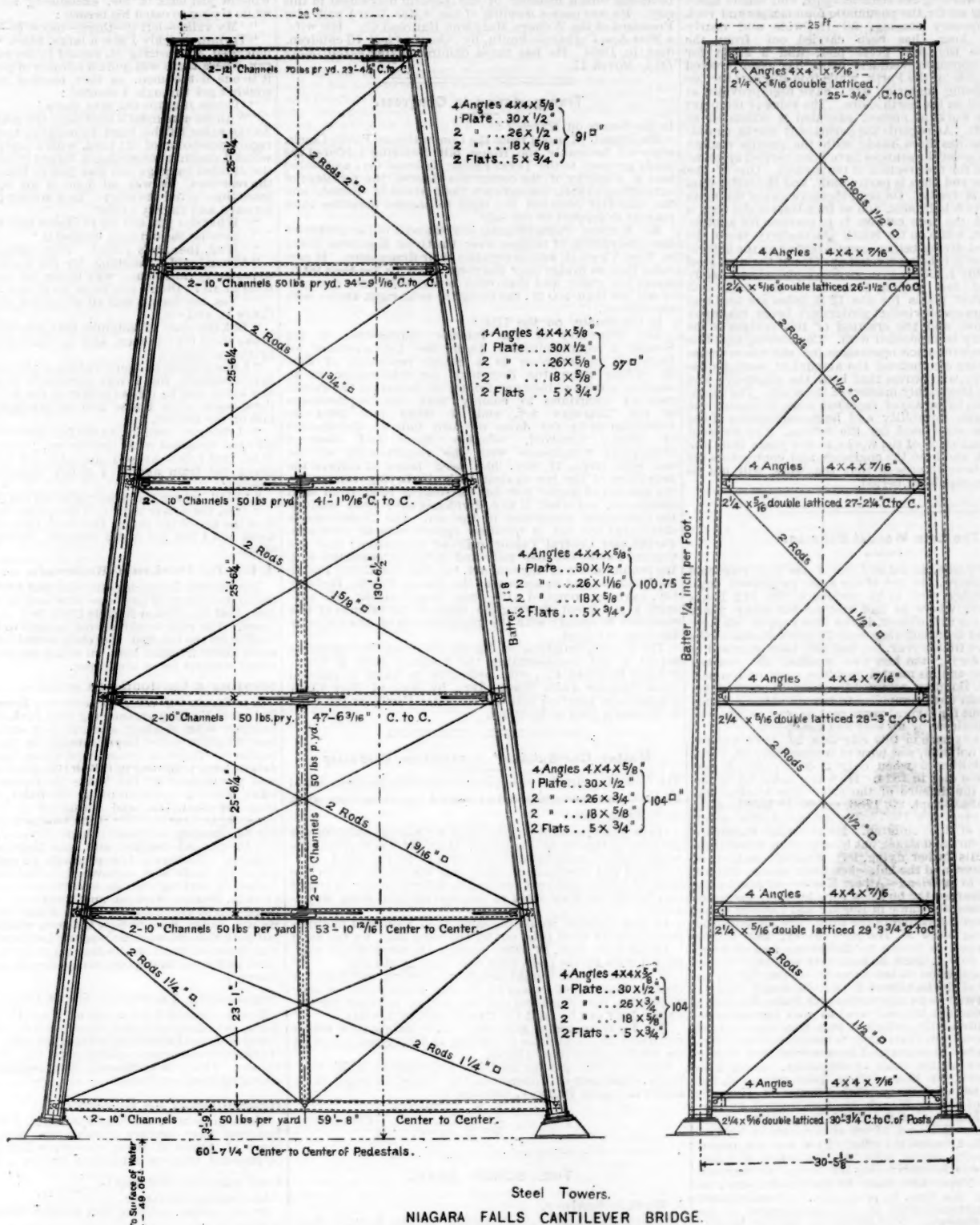
I remain, INQUIRER.

[The facts mentioned by "Inquirer," and the practice which he recommends of using a pretty high elevation, are contrary to the general custom on the best lines in this country, or perhaps it would be more correct to say, the tendency, since there can hardly be said to be any general custom. The rule which is probably more used than any other by leading lines is to elevate 1/2 in. per degree of curvature, but if there is in existence a particle of direct and trustworthy evidence to show that an elevation of twice this amount, or even more, would really be disadvantageous, up to a maximum of 6 or 8 in. in all, we do not know of it. We must not be understood as advocating any such rate of elevation, but simply as noting the absence of experimental evidence either way, and we desire at least to point out a fallacy which runs through a surprisingly great number of discussions of this subject, viz., that the elevation should be sufficient to just balance the centrifugal force, and that any excess or deficiency is necessarily injurious. As one recent example, Mr. John C. Trautwine, Jr., in our issue of Feb. 1, 1884, quotes Mr. Cleemann, with approval, as suggesting that "these opposing forces must at times balance each other, so that we might suppose a case where the elevation, combined with widened gauge, might be just sufficient to keep all the flanges from touching the rails, so that the train would pass around sharp curvature with no greater resistance than over straight track."

Now any inquiring student who "wants to know, you know," has only to walk out to the first sharp curve in the nearest yard—and the higher its elevation the better for the purpose recommended—and watch the first freight train that creeps around it in switching, and he will invariably find, by watching the outer rail, that the front wheel of each truck grinds hard against it. And this will also be the case, we may note in answer to a recent correspondent, whether the train be pushed or pulled around it. Observation of the flange-wear on the rails, moreover, will show that it is confined to the outside rail, everywhere and always, independent of speed of train.

In such cases the superelevation required to balance the centrifugal force is practically nothing. All the superelevation is in excess of that indicated by the discussions of most theorists—and many very practical men are numbered among these theorists. If, therefore, in spite of this excessive elevation, the flanges still crowd against the outside rail, and never the inner, what is the legitimate conclusion? Plainly that there is some other force than the centrifugal, independent of speed, and of much greater magnitude than the latter force, which acts in conjunction with it and opposes and overbalances the effect of the highest ordinary superelevation. This force is the tendency of the truck to roll in a straight line and not in a curve, but precisely how it acts we cannot now discuss, for two good reasons: we have not space and we do not exactly know; neither do we know of any one else who does. It does not necessarily follow from these facts that a high elevation is the proper thing to use, but it does follow that when a certain high elevation is shown to be in excess of the centrifugal force the case is not necessarily proven in favor of reducing it, as many take for granted; and it does follow that there are cogent reasons for suspecting that a very low rate of superelevation may have an injurious effect upon slow trains, as it admittedly does upon fast trains.

There may easily be in existence some definite



Steel Towers.
NIAGARA FALLS CANTILEVER BRIDGE.

Thirdly. That an error of 0.01 per degree will not seriously affect the velocity of trains on curves of ordinary length—far less than a slight settling of fills.

E. HOLBROOK.

[Mr. Holbrook's report of his test would indicate that the resistances of his two trains were in fact very nearly alike, and if so, it may be accepted as a positive indication that the curve resistance of his trains, at the speeds and under the circumstances stated, was something over one pound per ton per degree, which is what a compensation of 0.05 per degree amounts to. Mr. Holbrook's computation of the amount of this excess, however, is in error. The exact resistance indicated by his data is 1.131 lbs. per ton per degree, corresponding to a rate of compensation of 0.0566 per degree of curvature, instead of .06, as stated; as follows:

Initial velocity of both trains, which we may assume to have continued uniform in the head train without any error which would appreciably modify the computation..... 15. ft. per sec.
Final velocity of rear train $\frac{800 - (12 \times 2)}{53 \frac{1}{4} \text{ seconds}} = 14.55$ " "
" 800 = 53 1/4 seconds.
Velocity-head due to 15 ft. per sec., being the vertical height through which a train moving at that velocity can lift itself vertically before coming to a state of rest;
 $A = \left(\frac{v}{g} \right)^2 = \dots\dots\dots 3.498$ ft.
" Velocity-head " due to 14.55 ft. per sec. 3.291 "
Loss of "velocity-head" due to curve resistance 0.207 "
Then $\frac{0.207 \text{ ft.}}{(800-12) \text{ ft.}} = .02635$ ft. per 100, equal to a resistance in pounds per ton of 0.525 lbs., or 0.131 lbs. per ton per degree of curvature.

This latter is, under the conditions of the experiment, the excess of curve-resistance over that compensated for by the reduction in grade of .03 per degree of curvature, which is 1 lb. per ton.

This resistance, thus deduced, is large; more than double that indicated by authentic experiments on similar trains at higher speeds. So far as it goes it tends to confirm indications deduced from other experiments, as well as from the general laws of friction at low velocities, that it is to a greater or less extent inversely as the speed. Another correspondent alludes to this supposed fact as one of general observation in operating. Can any of our readers give further facts on this subject?

As to Mr. Holbrook's conclusions on the effect of elevation of outer rail in this experiment, we refer him to a letter on that subject in another column. We think he may be hasty in his conclusions, or at least much more definite in the correction which he proposes to apply than present knowledge justifies.—
EDITOR RAILROAD GAZETTE.]

Niagara Falls Cantilever Bridge.

In our last issue we gave views of the shore and river arms of the cantilevers, and a general elevation of this remarkable and interesting bridge. We now supplement these illustrations by others showing the towers. The illustrations are sufficiently clear and explicit to need little explanation. The diagram of the strains shows the areas of the various parts of the towers in square inches, on the right-hand side of the illustration; while the strain in pounds produced by the maximum possible loading due to

the combined effects of wind pressure and live and dead loads are shown on the left-hand side.

L denotes strains resulting from live load.
d do. do. dead load.
w do. do. wind pressure.
— denotes tension.
+ do. compression.

The top line of the rectangle drawn above the towers denotes the horizontal centre line at which the wind pressure acts on the top chord, which is some little distance above the top chord of the cantilever. The lattice bracing, which enables the cantilever to keep its form against lateral distortion, is not shown in this diagram. The estimated maximum wind pressures on the top and bottom chords respectively, are shown on the diagram in pounds pressure; the figures being written horizontally at the upper and lower right-hand corners of the rectangle denoting the cantilever. The maximum wind pressure has been assumed at 30 lbs. per square foot on a surface twice the area of one face of the truss, plus area of floor system, plus the area of face of train taken at 10 ft. vertical height.

The top caps of the towers are of cast steel, but the lower caps are of cast iron, and their construction will be clearly shown in an illustration in a forthcoming number of the Railroad Gazette.

The Forth Bridge.

The engineers, Messrs. Fowler and Baker, report that the contractors, Messrs. Tancred, Arrol & Co., have practically completed their arrangements for the manufacture of the large spans and for the grading of the great piers. Nearly the whole of the required machinery is on the ground, including 20 steamboats and barges of different classes, more than 50 steam and hand cranes, and about 30 steam engines, some of which are to be used for driving the machin-

ery, others for working the electric lights, and others again for compressing air for the pneumatic foundations and rock drills. A temporary staging, 50 ft. wide and nearly half a mile long, has been carried out from the south shore to the first great pier, and a stage for building the approach viaducts upon has been erected on the north side of the Forth, while iron stagings for the purpose of landing material, etc., have been provided at Inch-Garvie and on the north shore. The value of the plant and temporary works at present executed is estimated at about £180,000. As regards the permanent works, considerable progress has been made with the granite viaduct piers, which in several instances have been carried up to the height required for the erection of the girders. One of the large cantilever end piers is partly built, and the coffer-dam for the other is ready. On the Fife shore one of the main cylindrical piers is half built, and at Inch-Garvie the rock is excavated and the iron caisson is in position for another cylindrical pier, while on the South Queensferry shore the first of the great diving-bell caissons is resting on the launching ways, where it is being riveted up. One of the large steel bed-plates for the 1,700 ft. span girders is planed and partly drilled, all of the holding-down bolts are ready and some of the steel plates for the 12 ft. tubes are bent and planed. The approach viaduct girders are being manufactured at Glasgow, and the erection of this portion of the work will shortly be proceeded with. Considering that it is only thirteen months since operations for the construction of the bridge were commenced the amount of work done is very satisfactory, and proves that both the engineers and contractors are thoroughly masters of the work. The greatest care is taken, by means of repeated tests, to insure the greatest strength, durability and homogeneity of the Siemens Martin steel used for the bridge. The contract time for the completion of the works is five years from the commencement, and both the engineers and contractors see no reason to believe at present that the work will not be done within the stipulated period.

The Late Wendel Bollman.

Mr. Wendel Bollman, an old and one of the best respected citizens of Baltimore, and one of the most prominent engineers in the country, died at his residence, No. 112 Pennsylvania avenue, where he had resided for many years past, this morning at 7 o'clock, in the 71st year of his age. Mr. Bollman had been suffering from Bright's disease of the kidneys for more than a year, but had not been confined to the house until during the last two months. He retained his consciousness and his mental faculties were undimmed to the last. Mr. Bollman retained the active control of his extensive interests until compelled to remain at home by his fatal sickness, but for several years past he was assisted in conducting his business by his sons and son-in-law.

Mr. Bollman was born in this city Jan. 21, 1814, and his father, Thomas Bollman, was born in Bremen May 28, 1775, and came to Baltimore when only 2 or 3 years of age. The elder Bollman died in 1814. He was a baker by trade, and assisted in the defence of the city. The mother was born in Weissenbach Sept. 20, 1786, moved to Baltimore in 1800, and was married in 1805. The subject of this sketch was the seventh of eight children. He attended Bassford's free school on Courtland street, but his education was mainly self-acquired. His father dying, left Wendel's mother in poor circumstances, and the lad, when quite young, entered the drug store of a friend—Albert Kaster—at Shepherdstown, Va. He learned the business very rapidly, having in six months acquired the name in English and Latin of every drug, tincture and compound in the store. He subsequently went into a drug store at Harper's Ferry, but falling sick was compelled to return to Baltimore and undergo treatment. On July 4, 1838, he took part with the boys of the city in the procession on the occasion of the laying of the corner-stone of the Baltimore & Ohio Railroad. Shortly after that he entered as an apprentice with Paine Holland, a carpenter, but soon left him and went to work for the Baltimore & Ohio Railroad Co., which at that time was engaged in laying the track from Pratt street to the Carrollton bridge over Gwynn's falls. He remained here a year, but finally returned to work at his trade of carpenter. Going into business for himself, Mr. Bollman was quite successful, but in 1837, while engaged in building a house at Harper's Ferry for a son of Bishop Waugh, he was invited by Mr. James Murray, Engineer of the Road Department of the Baltimore & Ohio Railroad, to act as foreman of bridges on that road. He accepted the offer. This was the beginning of a successful career with the Baltimore & Ohio. His first work was reconstructing the bridge at Harper's Ferry in 1837. From that time he continued to work on the road, and in due time, by promotion, he found himself intrusted with responsibilities in the management of the mechanical departments. Still advancing, he next became Master of Road, and was intrusted with entire care and management of its tracks, buildings, bridges and all other stationary structures. In this enlarged sphere he became an inventor, and his name grew to be known among men. Yet he continued his labors with the Baltimore & Ohio, and though often tempted to assume a still wider field for his fame, or to yield to more inviting prospects of personal rewards, he remained with the road until 1853, a period of 18 years, on his second engagement. At this time, however, his fame had spread to other lands, and he went successively to South America, Mexico and Cuba. On the occasion of his departure, Feb. 10, 1859, some 3,000 employees of the Baltimore & Ohio presented him with a magnificent service of plate and a massive gold watch and chain, costing \$3,000.

During his connection with the road Mr. Bollman constructed the following iron bridges: Two iron bridges at Elysiville, one each at Monocacy, Marriottsville and North Branch and the Winchester span of the Harper's Ferry bridge on the Main Stem, and the Savage and Bladensburg bridges on the Washington Branch. Mr. Bollman put up 200 spans of iron bridging on the Main Stem alone, and is given the credit everywhere of being the first successful iron bridge builder in the world. When he withdrew from the Baltimore & Ohio he went into business with John H. Tegmeyer and James Clark. The firm was dissolved in 1863, and the business has since been conducted by Mr. Bollman at the immense works at Canton. One of two bridges built for Chili, South America, contains four spans of 415 ft. each. Mr. Bollman designed the first iron trestle work made of hollow wrought-iron columns with cast-iron caps.

The iron bridge at Harper's Ferry, built in 1864, is Mr. Bollman's master-piece, and is a marvel of skill and beauty. It is the only bridge of the kind in its construction and formation known, being the wonder and admiration of American and English engineers, and will long stand to attest the inventor's superior skill and knowledge of the equilibrium of forces. In 1867 and 1868 Mr. Bollman built for the Wilmington Railroad Bridge Co. of North Carolina two bridges on cast-iron cylinders sunk to a depth of from 65 to 80 ft., and was first to use the pneumatic process in this work. The contract was for \$480,000.

Mr. Bollman took but little interest in politics, except to

be at one time a member of the Reform movement in this city. He was once a member of the water board and also President of the Western Maryland Railroad Co. His wife, a Miss Ann Catharine Smith, by whom he had 10 children, died in 1869. He has three children living.—*Baltimore Day*, March 11.

Transportation in Congress.

In the Senate on March 7:

Mr. Plumb (Kansas) from the Committee on Public Lands, reported favorably the House bill declaring forfeited the lands granted to the Texas Pacific Railroad Co., and stated that a minority of the committee desired the privilege of submitting at their convenience their views in dissent, and the majority reserved the right to present hereafter their reasons in support of the bill.

Mr. Mitchell (Pennsylvania) introduced a bill to authorize the construction of bridges over the Great Kanawha River in West Virginia, and to regulate their dimensions. It provides that no bridge over the river shall be less than 90 ft. above low water, and that each bridge shall have one span of not less than 400 ft., the bridge to be at right angles with the current.

In the Senate, on the 11th:

The Secretary of the Interior transmitted to the Senate a communication from the Commissioner of Railroads in response to a Senate resolution of Feb. 25 calling upon the Secretary for information as to whether there had been any failure on the part of the Pacific railroad companies to comply with the requirements of the Thurman act, and if there had been information as to the dates of such failures, the amount of money involved, whether there had been a subsequent compliance with the requirements of the act, what steps, if any, had been taken to enforce the provisions of the law against such disobeying companies, the amount of money now due the sinking fund from such companies, and what, if any, dividends have been paid by the companies mentioned in the act. The Commissioner states that the act in question applies only to the Union Pacific and Central Pacific railroad companies; that the Central Pacific Co. has fully and promptly complied with the requirements of the said act, but that the Union Pacific Railroad Co. and its successor, the Union Pacific Railway Co., have not complied with these requirements. He submits a statement showing the dates of the failures of this company to comply with the requirements of the act, with the sums involved.

The House Committee on Pacific Railroads has agreed to report a bill incorporating the Spokane Falls & Coeur d'Alene Railroad Co., with authority to build a railroad from Spokane Falls, Wash. Terr., by way of Fort Coeur d'Alene to a junction with the Northern Pacific or the Utah & Northern road in Montana.

Master Car-Builders' Association Circulars.

The following circular of inquiry to members has been issued by the Committee appointed to make a report on Piece-work in Building Cars:

Have you ever built freight cars by letting out different portions of the car by the piece? If so, did you find that the work could be done cheaper than if done by the day?

Would you recommend letting out the whole car to one man, or letting different portions to different men; or would you let out the wood-work to one, and the iron-work to another?

In your opinion would the same shop room and facilities produce more work if let out by the piece than by the day? Please state how, in your opinion, the work would compare if done by the piece with that done by the day.

If you have built freight cars by piece-work, and found it cheaper than to build them by the day, please state, as near as possible, how much less per car (taking box-cars for example) they can be built for than if built by the day.

You are requested to give any other information which will assist the Committee in making an intelligent report on the subject submitted to them.

Replies to this circular should be addressed to B. K. Verbyck, Chairman of Committee, Car Shops, Chicago, Rock Island & Pacific Railway, Chicago, Ill.

B. K. VERBYCK,
JOHN KIRBY,
W. B. SNOW, } Committee.

THE SCRAP HEAP.

A Buffalo Scalper.

General Passenger Agent Baldwin, of the Buffalo, New York & Philadelphia road, has had some trouble with a person calling himself Mr. Sol. Sam, who is described as a stout, well-appearing Jew, with sandy flowing beard, who advertises himself as a proprietor of "Sol. Sam's Modern Minstrels," giving his permanent address as Morristown, N. J. Mr. Sam procured from Mr. Baldwin 20 tickets from Buffalo to Pittsburgh at the reduced theatrical rate, and also obtained from the Lake Shore office one ticket to Chicago and an order for 20 others at the reduced rate. At the Erie office in Buffalo he obtained 23 tickets good from Buffalo to New York. On the following day Mr. Baldwin learned that the tickets bought by Sam had been sold at Herschel's ticket office at Buffalo at a slight advance upon the price paid. Mr. Baldwin at once made a complaint to the police, who arrested Sam and brought him before the police court on a charge of grand larceny and obtaining tickets under false pretences. It was claimed by the prosecution that he had represented himself at the different ticket offices as proprietor of a traveling troupe, and obtained the tickets with that understanding. His offence consisted of getting the tickets in this way, and immediately selling them to a broker. The justice held him in bail, but the case was not brought to trial but finally compromised, Sam paying each agent of whom he bought the tickets the difference between the theatrical and full rate. The whole affair cost him about \$200, and he left Buffalo. A day or two afterward, however, he sent from Batavia, N. Y., a letter to Mr. Baldwin, in which he claimed that he had done nothing wrong. He also asserted that he was really proprietor of a traveling troupe, and that he bought the tickets as a sort of free advertisement. He sought to heap coals of fire upon Mr. Baldwin by sending him complimentary tickets to the performance of his troupe when it should appear in Buffalo.

His Valise.

"Well," said Conductor Jones to a *Globe* representative, "one of the funniest things that ever happened on my train occurred one day at Bethlehem. An old man, whom I had noticed in the drawing-room car as a very lively and talkative traveler, got off at that station. I was standing at an open window of the car just as the train was starting off, when, whom should I see but the jolly old man rushing toward me from the outside. He pointed frantically to a

window just back of me, exclaiming as well as he could while trying to catch his breath:

"My valise—left it—there—throw it—out."

"Turning quickly I saw a large, black valise in the seat indicated, and, seizing it, rushed to the rear platform of the car, where there was quite a number of gentlemen. Tossing it to one of the men, as they blocked the way so that I couldn't get through, I shouted:

"Throw it to the old man there."

"Without a moment's hesitation the man did as directed. As the valise left his hand he made an ineffectual effort to regain possession of it; then, with a muttered exclamation which I couldn't comprehend, leaped from the train, seized the ill-fated baggage and was just in time to board one of the rear cars. It was all done in an instant, although it takes time to tell the story. In a minute he made his way forward and angrily asked:

"What did you tell me to throw this valise off for?"

"Because the old man wanted it."

"Well, then, he's a thief. That valise is mine."

"Then," said I, laughing, for the whole situation seemed so perfectly ridiculous, "why under the sun did you throw it off at all? Didn't you know your own property?"

"Yes, but then it was all so sudden, and you told me to throw it, and—"

"But the roar of laughter that greeted his explanation broke short his sentence, and he was voted a leather medal by the passengers."

"I was convinced there was some explanation for the old man's conduct, for I was personally acquainted with him and knew that he was as honest as the day was long. About three weeks after I saw him at the depot, and questioned him on the subject."

"I thought," said he, "as his face grew round and red and his eyes twinkled with merriment, 'I thought I should die to see that fellow hyper round after his valise and hustle on board the train again. I didn't expect to cause so much trouble.'"

"Well, where was your valise all the time?"

"Oh, the driver took it without my knowledge and put it on the top of the stage. He's been carrying it around ever since, and I just got it this moment. Good day?"—*Boston Globe*.

A Use for Bankrupt Railroads.

The Central Massachusetts road just now is not of much use to its owners or any one else, and a Boston man suggests that the Boston Bicycle Club buy it for an exercise track. The rails would sell for enough to lay down a plank road upon the ties and the club would then have a level track about 40 miles long, on which the members could exercise without let or hindrance.

Stealing a Car-load of Cotton.

A telegram was received yesterday from New Orleans by Detective Furlong announcing that L. A. Poyner, the man charged with stealing a car-load of cotton, had been sentenced to four years' imprisonment in the Louisiana penitentiary. The robbery occurred about May 25 last, and the details were published in full in the *Republican*. Poyner was yardmaster of the Texas & Pacific road at New Orleans, when a car containing 33 bales of cotton shipped from Jefferson, Tex., and consigned to Fall River, Mass., via Morgan Line steamer from New Orleans, arrived. Seeing an opening to make a haul Poyner, it was charged, had the car side-tracked, and sold the contents to a cotton pickery. Pocketing the proceeds he quietly left the city before the theft was discovered. The case was placed in Detective Furlong's hands, who traced the fugitive through Canada, Mexico, Arizona and California, and finally captured him on Oct. 25 at the Dalles of the Columbia in Oregon. He was taken back to New Orleans, where he remained in jail until Feb. 26, when he was tried and convicted. Sentence was deferred until yesterday, when he was brought into court and given four years as stated.—*St. Louis Republican*, March 7.

Negotiating Uncurrent Securities.

Messrs. Colwell & Canning, of No. 115 Broadway, New York, have arranged, and announce that they have exceptional facilities for dealing in the notes and other obligations of railroads, car trusts, rolling mills, etc., not having current values. This is in addition to their regular business of supplying railroad equipment.

Remembering an Engineer.

The engineers on the East Tennessee, Virginia & Georgia Railroad have erected a handsome monument over the grave of Alfred M. Perry, one of the best known engineers on the road, who was killed last August in an accident.

Uncongenial Company.

In a railway carriage:
An old soldier, noticing that his pipe troubled a lady, said to her:

"They don't smoke in your regiment, ma'am?"

"In my regiment, it is possible," replied the lady, "but in my company, never!"—*From the French*.

A Libel.

This is what Senator Thurman, of Bedford, said when the Senate was considering the bill in regard to fencing railroads: "I happen to know something about that narrow-gauge road in Franklin and Pittsylvania. I do assure gentlemen there is no chance for stock to be killed by that road. If there is a cow in Pittsylvania that can't outrun that concern, it ought to be killed. [Laughter.] The only danger is that the cars will be run over by the cattle. [Great laughter.] My dear sir, they carry a yoke of oxen behind to pull them up the hills. They bring them round and hitch them before the engine. There is no danger to stock. If any hog, horse, cow or sheep is ever overtaken by this train it ought to die." [Merriment].—*Richmond (Va.) State*

Singular Accidents.

Two singular railroad accidents have lately occurred in England. In one case a baggage barrow was blown off a wayside station platform just in front of a flying Scotch Pullman express. The barrow was smashed, but the engine and train kept the track. Another curious accident happened on Christmas Day on the Great Western Railway. The second portion of the night mail was to be run as a double-header over the 130 ft. to the mile gradients between Newton Abbot and Plymouth. After coupling up one engine to the train the porter on duty went to the back part of the train to detach the last coach. The second engine backed on the train just after the porter left. At 3:35 a. m. the signal was given for the train to start. Both engines sounded their steam whistles, and the train left. There was a thick fog at the time. When the leading engine got out of the cutting at the south side of the station the enginemaster thought that he was running faster than usual, and on looking round he found that his engine had no train attached to it. He could not hear or see anything of his train, and therefore assumed that he had left it at Newton Abbot station, and at once applied the steam brake to stop his engine; but it was still moving at a speed of about three miles an hour when it was run into by the engine that was attached to the mail train, which was running at a speed of 25 to 30

miles an hour. The two engines were a good deal damaged, and the two front wheels of the foremost engine were knocked off the rails.

Some one evidently forgot to couple the two engines together. There is a tradition on a line that shall be nameless that an engine once ran over 20 miles in a foggy night before he discovered that he had left the mail train at the last water crane.

A Runaway Car.

The sight of a runaway car tearing down a steep grade of the Radford, Bordell & Kinzua road where it curves around Mt. Raub, 300 ft. above Main street, attracted the attention of many persons yesterday afternoon. So great was its velocity that it passed out of sight in a few moments and idlers walked to the depot to see if the vagrant would come dashing in and telescope the baggage room. The train car failed to arrive, however, having taken a flying leap from the track near the trestle about a mile from the depot, and landing in the ditch in a demoralized condition. The cause of the runaway was as follows: On an outgoing freight train a baggage car was attached to the rear in lieu of a caboose. In going up the grade about three miles from town the coupling gave way, and as there chanced to be no one in the car at the time to set the brakes it dashed away with constantly increasing momentum. The engine sent out a long alarm whistle, to which the car, of course, paid no attention, and the refrain was taken up by several noisy monsters in the railroad yards. To those who were not posted the pandemonium sounded like a fire signal and several hose companies started for their quarters only to be turned back immediately. Had there been a passenger in the car he would have had occasion to remember the wild ride as long as he lived, if he escaped alive.—Bradford (Pa.) Era, March 4.

The Use of Natural Gas.

Natural gas appears destined to play an important part in the economies of production at the works near Pittsburgh. The Edgar Thomson Steel Works own a gas well at Murrysville, some 12 miles from their mill. From this well an 18-in. pipe is laid to the works. At the well the pressure is about 120 lbs. to the square inch, which is reduced in transmission to about 60 at the works. Some 15 to 16 volumes of air are required to properly consume 1 volume of gas. At first the gas was conveyed through a 2-in. pipe, to which a reducer was attached, to weaken the pressure, direct to the boilers, but this was dangerous, creating a liability to explosion. The plan now is to have the gas in checker-work. Its use under 48 boilers has saved the labor of 82 men. Captain Jones has also used the gas in the carbonization of spiegel in the ladle, blowing it into the bottom of the molten metal.

Wilson, Walker & Co. have also been using the gas since last June, and find it gives excellent results. The gas in many cases has neither taste, smell nor color, and it is therefore difficult to detect a leakage, and this might possibly lead to dangerous explosions, though the leakage of an odorless gas under pressure may be readily detected by the sound of the escaping gas. When, however, the gas comes from the vicinity of the oil rock it has a perceptible odor of petroleum. Chemically the gas is nearly pure hydrogen, and, therefore, its combustion yields an enormous amount of heat.

Experiences of a Royal Traveler.

Even crowned heads have sometimes to undergo those little annoyances in traveling which often befall more humble personages. An amusing instance is given in Queen Victoria's Diary, which has been lately published.

"Tuesday, August 20, 1867.—At 10 o'clock I left Windsor (those night departures are always sad) with Louise, Leopold, and Baby (Beatrice); Lenchen, Christian, and their little baby boy meeting us at the station. * * * I had been much annoyed to hear just before dinner that our saloon carriage could not go under some tunnel or arch beyond Carlisle, and that I must get out and change carriages there.

"Wednesday, August 21.—The railway carriage swung a good deal, and it was very hot, so that I did not get much sleep. At half-past seven I woke up to dress and hurry out at Carlisle, which we did at a quarter to eight. Here in the station we had some breakfast, and waited an hour till our carriage was taken off and another put on (which they have since found out was quite unnecessary)."

It is terrible to think what awful consequences would have followed in the good old days of Queen Bess or "Bloody Mary." The Master Car-Builder of that period would probably have found himself suspended from the highest battlement of some frowning castle, while the General Manager might have been appropriately consigned to the lowest dungeon, and the station agent beheaded. But alas! these days have fled, the times have changed, and we find real live dukes acting as engineers, and let us charitably hope, running a train on time, for further on we read in an account of another journey:

"After passing slowly Tain and St. Duthus (called after the Cathedral there), we thought, as we did not stop, and were not to do so, that we would take our tea and coffee—which kept quite hot in the Norwegian kitchen—when suddenly, before we had finished, we stopped at Bonar Bridge, and the Duke of Sutherland came up to the door. He had been driving the engine (!) all the way from Inverness, but only appeared now on account of this being the boundary of his territory, and the commencement of the Sutherland Railroad. He expressed the honor it was to him that I was coming to Dunrobin. There was a most excited station master who would not leave the crowd of poor country-people in quiet, but told them to cheer and cheer again, another 'cheer,' etc., without ceasing."

The dining-car appliances seem a trifle elementary, and it does look as if it might be worth the while of some enterprising Yankee to introduce the latest appliances in the way of luxurious traveling to her Majesty's notice. English railroad authorities evidently don't take as much care of her as loyal subjects ought; for they not only make her change cars unnecessarily, but actually send her over a dangerous bridge, for another extract reads:

"June 20, 1879.—We then began going over the marvelous Tay Bridge, which is rather more than a mile and a half long. It was begun in 1871. There were great difficulties in laying the foundation, and some lives were lost. It was finished in 1878. Mr. Bouch, who was presented at Dundee, was the engineer. It took us, I should say, about eight minutes going over. The view was very fine. * * *

The Tay Bridge was destroyed in the same year (1879) in the gale of the night of Dec. 29, when a whole train with upwards of 80 passengers was precipitated into the Tay."

A Triple Accident.

A correspondent of the Atlanta Constitution, writing from Macon, Ga., March 8, says: "A singular collision occurred this morning at 7 o'clock as the result of carelessness, on the East Tennessee, Virginia & Georgia Railroad in this city, between the railroad track of the Central road and the park. Two engines collided on the curve. One was a regular shifting engine and the other the engine of the north-bound freight, but it was not attached to the train at the time of the collision. Messrs. Smith and

Sheridan were the engineers. The two locomotives came together with considerable force, doing some damage, and became interlaced or fastened together. Both of the engineers were bruised somewhat by the shock of the collision, and one of the firemen had his arm and shoulder hurt. The fireman went back to the yard to get another engine to pull the two collided engines apart. As this third engine was coming the fireman was unable to reverse it, on account of his hurt hand, and his engine ran into the other two and knocked them both off the track. Superintendent Mallory has suspended both of the engineers, Smith and Sheridan, pending his investigation of the matter."

A Memorial to One of the Inventors of the Locomotive.

A beautiful memorial window has just been erected in Newburn Church to the memory of the late William and Thomas Hedley, the one the inventor of the locomotive engine, who was born at Newburn, and the other his son, the practical founder of the bishopric of Newcastle. The subjects chosen by the artist are "Noah and his three sons building the ark," illustrating the genius given by God to man, and the parable of the talents, typifying the good use of the genius and wealth that man is blessed with. Above the first group is a scroll with the text, "And thus did Noah according to all that God commanded him," and above the other, "Well done, thou good and faithful servant." The work has been executed by Mr. W. H. Atkinson, of this city. At the base of the window is a large brass plate, engraved by Mr. A. Reid, of this city, bearing the following inscription: "The above window is dedicated by William Hedley, of Newton, in this county, to the glory of God, and in loving remembrance of his relatives interred in the adjoining churchyard, amongst whom are his father, William Hedley, of Newton and of Burnopside Hall, near Lanckester, Esquire; and his brother, Thomas Hedley, barrister-at-law also of Newton, Esquire. By the inventive genius of the former, the locomotive engine was first brought into successful operation, A.D. 1812 and 1813 at Wylam; and chiefly through the munificent bequest of the latter the bishopric of Newcastle-upon-Tyne was created in 1882." At the bottom of the plate is the representation of a railway engine, and underneath are the words: "Drawing of the first locomotive invented by William Hedley, originally placed in Kensington Museum."—Newcastle-on-Tyne (England) Northern Express.

Height of Bridges Over Railroads.

The Massachusetts Railroad Commissioners have given their decision on an important matter relative to the height of bridges over railroads, as follows:

"The selectmen of Westboro desire to construct a bridge for a townway over the Boston & Albany Railroad at a height less than 18 ft. above the track. This new crossing is especially desirable because the only existing one in this compact and growing town is on a level with the track, which bisects the main village. It will be used by many school children, who now cross without right of way. The reason for desiring a low bridge is the usual one—economy in cost and less inconvenience to traffic. And it is urged that, as there is an old bridge only 16 ft. high about 600 ft. from the proposed one, it will not practically increase the danger to brakemen."

"This argument is supposed to be supported by the action of this Board permitting the construction of such bridges over the same railroad within the city of Boston at a period not very remote. But those cases differ from this because there was a series of low bridges, 9 or 10 in number, erected before the present law, and bearing such relations to costly buildings on Washington street and other important avenues that they were regarded as permanent. Under these circumstances it seemed to our predecessors that the peril would not be increased by adding one to a succession of low bridges standing very near to each other. Indeed, it might be urged that one exception to the several systems of Boston bridges might lead some man into danger, if he should mistake the locality of the one bridge under which he could safely stand upright."

"This argument does not apply in this case. Here is no long succession of neighboring bridges. We cannot authorize a second cause of accident simply because one already exists. On the contrary, if on this account we should grant the petition, we should not only authorize a new danger, but sanction the continuance of an old one. It is almost certain that the present bridge must soon be reconstructed when an additional track is laid, and this new bridge, unless for good reasons to the contrary, must be 18 ft. above the track. We ought not to authorize a dangerous structure now upon an argument that will soon compel a second one. The petitioners are right in supposing that this is not a question between the town and the railroad company. The consent or opposition of the corporation is of little consequence. It is a question of human life, and the policy of the law is to protect life by enforcing the statute provision. Some strong reason must be given for establishing an exception to the general rule. No such reason has been given in this case for permitting a structure which would probably cause the loss of at least one life in the course of a generation. Regretting the increased cost of this desirable improvement and the additional inconvenience caused by the 2 ft. of ascent for travellers, the Board does not feel justified in granting the petition."

TECHNICAL.

Locomotive Building.

The New York Locomotive Works in Rome, N. Y., have taken a contract to build 12 locomotives for the Northern Pacific road, to be paid for in installments.

The Baldwin Locomotive Works in Philadelphia have recently shipped several narrow-gauge locomotives to the Jacksonville, Tampa & Key West road.

H. K. Porter & Co., in Pittsburgh, have received an order for another light locomotive to go to Japan.

The Manchester Locomotive Works in Manchester, N. H., last week shipped a new locomotive to the New York, Providence & Boston road.

Car Notes.

The New York, New Haven & Hartford shops in New Haven, Conn., have completed a very handsome car for the use of the President and directors of the road.

The Cambridge City Car Shops at Cambridge City, Ind., have just completed 100 coal cars, to carry 20 tons each, for the Wabash, St. Louis & Pacific road.

The Youngstown Car Works in Youngstown, O., have recently secured orders that will keep the shops busy for several months.

The Missouri Car & Foundry Co. in St. Louis has an order for 100 refrigerator cars to be used in transporting meat from Texas to northern points.

Bridge Notes.

The Morse Bridge Co. in Youngstown, O., has received orders for a number of small bridges to replace old ones carried away in the recent floods.

Messrs. Anderson & Barr are making arrangements to begin work on the new bridge over the Arkansas River at

Little Rock, Ark.; and will soon have a large force employed. The piers will rest on caissons, which will be sunk to the bed-rock by the pneumatic process. Contracts have been let for piles and for the timber work of the caissons.

Iron Notes.

A dispatch from Birmingham, Ala., says that arrangements have been perfected to consolidate the Pratt Coal & Iron Co., the Alice Furnace Co. and the Linn Iron Co., all in or near Birmingham, into one organization, with \$3,000,000 capital. The property of the new company will be the most extensive coal and iron property in the United States, and will include 100,000 acres of coal and iron lands, 500 coke ovens, two blast furnaces with a daily capacity of 150 tons. The Pratt Co. is already mining from 2,500 to 3,000 tons of coal daily. The new company intends to build several new furnaces as soon as possible.

The Thomas Iron Co. at Hokendauqua, Pa., is preparing to blow in one of its furnaces which has been idle for about six months past.

Lucy Furnace at Glendon, Pa., is being repaired and made ready to go into blast.

The Pennsylvania Iron Works at Lancaster, Pa., have shut down on account of the refusal of the employees to accept a reduction in wages.

The JReis Sheet Iron Mill in New Castle, Pa., is to be started up March 17 with a full force.

A company has been formed to build steel works in Wampum, Pa., to make a fine grade of tool steel.

Manufacturing Notes.

The Philadelphia & Reading Co. is about to change the gauge of the Philadelphia & Atlantic City road (lately acquired) to the standard gauge. The entire line will be relaid with 70 lb. steel rails. The Pennsylvania Steel Co. is making at Steelton, Pa., all the frogs, switches and crossings required for the change. The improved Lorenz Switch will be used with spring rail frogs, securing a safe, smooth track, suited for the fast and heavy excursion trains required for the Atlantic City business.

By the fire at the foundry in South Brooklyn on Thursday evening, Feb. 28, the Lidgerwood Manufacturing Co. lost only a small portion of its large stock of patterns. The New York daily papers reported the loss at from \$50,000 to \$70,000, whereas the total loss did not exceed \$6,000, the fire occurring in a room where fortunately very few patterns had been stored. The company lost no time in making new patterns, commencing the following day with a large force of pattern makers, and has now made such progress that it will very shortly have new patterns equal to those which were destroyed. By the system adopted by this company of always keeping on hand a number of castings of the various hoisting engines manufactured no delay has been occasioned in filling orders or building engines for stock.

The Hazard Wire Rope Works in Wilkesbarre, Pa., are making a wire cable 43,000 ft. long for a street railroad in Kansas City.

It is stated as one of the results of the recent meeting at St. Louis of barbed wire manufacturers that steps have been taken for the consolidation of all the barbed wire manufacturers in the country under the name of the National Barbed Wire Co. Another meeting will be held in a couple of weeks, at which the final arrangements for amalgamation and organization of the new company will be made. The announcement of this action has caused an advance of 1 cent per pound on the price of wire as fixed by the late meeting.

The Rail Market.

Steel Rails.—A number of small sales are reported, but no large orders are now on the market. The mills have a satisfactory amount of business, and are not expecting much addition at present. Quotations continue steady at from \$34 to \$35 per ton at mill, and there is no disposition to accept lower prices.

Rail Fastenings.—Spikes continue unchanged at \$2.50 per 100 lbs in Pittsburgh, and track-bolts at \$2.75 to \$3. Splice bars are quoted at 1.80 to 1.85 cents per pound. There is an increasing demand and a somewhat firmer market, although a heavy spring trade is not looked for by the manufacturers.

Old Rails.—There is an increasing demand for old iron rails, and they are pretty firmly held. Few sales are reported, buyers not being willing to pay the prices which are asked just now. It is difficult to make quotations, but they may be put at from \$22 to \$23 per ton for tees at tidewater in large lots, with a little higher rate for small lots.

Cable Railroads in New York.

The Rapid Transit Commissioners in New York have resolved to organize the New York Cable Railway Co., with \$2,000,000 capital stock, to build the various routes laid out by the Commission, as recently noted. Some further legislation will be needed to make the action of the Commission operative.

The Locomotive Engine Safety Truck Patent.

In the case of the Locomotive Engine Safety Truck Co. against the Pennsylvania Railroad Co., the United States Supreme Court last week gave a decision. The Court holds that the application of an old process or machine to a similar or any analogous subject, with no change in the manner of applying it, and no result substantially distinct in its nature, will not sustain a patent even if the new form of result has not before been contemplated. The patent sued on is consequently void for want of novelty. The decree of the Circuit Court is reversed, and the cause remanded, with directions to dismiss the bill.

This decision affects a number of other cases pending in the federal courts for infringements of the same patent.

The Philadelphia Electrical Exhibition.

A letter from Philadelphia, March 11, says: "Ground will soon be broken for the buildings in which will be held the Electrical Exhibition in this city from Sept. 2 to Oct. 11. The site selected is in West Philadelphia. One of the buildings will be triangular, extending 233 ft. along Lancaster Avenue and coming to a point on Thirty-third street; the other will be a spacious rectangular or oblong building with the principal front on Thirty-second street. This latter building will be constructed in a very substantial manner of wood, iron, and glass. It is proposed to make it a permanent one to be used for future exhibitions of different kinds, and for a variety of public purposes. The main building will be provided with four large towers on Thirty-second street, and two other towers of similar dimensions on Thirty-third street. From these towers electrical lights will be exhibited every evening during the continuance of the exhibition. The interior will be surrounded by wide galleries, which will be utilized for the use and display of philosophical apparatus, instruments of precision, etc. The ground floor will be divided into spaces or compartments of various sizes for the use of exhibitors."

"The exhibition will be strictly a labor of love on the part of the Franklin Institute and its other projectors for the advancement of science. No private interests of any kind will be considered, and it will be completely removed from anything partaking of the character of a financial speculation; the advancement of electrical science will be

the only object sought to be attained, and it is intended to embrace all the applications of electricity, and not employ those that interest the scientific mind alone. The idea of the managers is to give information on electrical subjects to the general public, and everything connected with art, science or mechanics to which electricity can be applied will be exhibited, even down to nickel plating, the preparation of carbons, etc. It is also intended to pay particular attention to historical exhibits and to trace the progress of the use of electricity from the time of Benjamin Franklin to the present day. The indications are that the European display will be of a very general and satisfactory character, as applications for space have already been received from England, Germany, Belgium, Switzerland, and other countries. It is understood that Belgium will make a very interesting historical display, and already 20 applications have been received from Germany and six from England. It is expected that by the time the exhibition opens nearly every European country will be represented. The United States government will make a very interesting exhibit of electricity as applied to war, the signal service, and navigation.

The Cowell Freight-Car Coupler.

A test of the Cowell automatic coupler for freight cars was made on the Valley road near Cleveland, O., March 7, of which the *Cleveland Leader* says: "It seems to be as simple in construction as an automatic coupler can well be—being a hook, similar to the Miller, with a pivoted head. Its owners claim for it that it is the cheapest self-coupler yet made, costing but little more than the common link and pin coupler. It is easily uncoupled and operated from the side or top of the car. It couples with any common coupling in using a link. The severest tests yesterday were made by coupling and uncoupling on the shortest curves."

Work on the Panama Canal.

In passing over the line of the railroad, we were almost continually in sight of the excavations being made for the bed of the canal, whose course, for a great part, runs almost parallel with the railway. Stakes planted by the surveyors to mark the levels and indicate proposed cuttings are to be seen everywhere along the railway route from Colon to Panama. Many miles of track have been laid, branching off from the main line at Paraiso, Rio Grande, Pedro-Miguel and other points, which trackways extend to the points where the excavations are in progress. As fast as the land dredges cut down the hills, the earth is loaded upon the cars and carried away to make the fillings at various points where the Panama Railroad Co. is extending its sidings and forming a complete double-track line across the isthmus. I am informed by the editor of the *Star and Herald*, of this city, that, by a new circular now in print, but not yet issued, M. Dingley will announce to all contractors that hereafter the Panama Canal Co. will pay to each contractor the following prices: For rock excavations and blasting, \$1.20 per cubic meter (the meter equals 39 in. English); for hard earth, 56 cents per cubic meter, and for soft earth, 28 cents. The company also proposes to furnish contractors with locomotives and cars to carry away excavated matter, charging \$14 per ton for the coal consumed on its locomotives. I noticed that since the French have obtained control of the Panama Railroad (which, nevertheless, has still an American President, Mr. Houston, of New York, and is operated under a charter given by the state of New York), they have changed the titles of all the locomotives, as they have the names, formerly Spanish, of most of the towns and villages along the canal route. Each new locomotive sent out from the United States bears the name of some French city or department, as Paris, Versailles, Rouen, Marseilles, Dieppe, Lyon, Dijon, Bordeaux, Meurthe, Gironde, Rochelle, or Le Mans. * * *

The administration of the Panama Canal Co. is based throughout all its functions on what is known in France as the "bureaucratic system," and is modelled after that of the French department of "ponts et chaussées" (roads and bridges). Thus, there is one "general director of the works," one "under chief," "sous-chef des travaux," a "chief of the bureau of correspondence," a "chief of the personnel," a "chef de comptabilité" (book-keeping department) and a corps of about 60 engineers. Of these latter, two are assigned to each one of the 14 sections into which the canal route is divided, and there are four engineers known as "division engineers;" the remaining 28 engineers are attached to the "technical department" ("bureau technique"), which has its headquarters in the company's building at Panama. The 14 sections into which the canal is divided are entitled: Panama, Paraiso, Culebra, Buena Vista, Emperador, San Pablo (meaning "St. Paul"), Bohio-Soldado, Obispo, Matichin, Corozal, Pedro-Miguel, Mamei, Gatun and Colon. The hardest digging is found on the sections between the stations of Obispo and Panama. Here it is that we find, as I noted on my trip down from Colon, a conglomerate rock, made up of grit, sandstone, clay, etc. It is now under consideration by the company's engineers to dig in certain places where no excavating has yet been done, to the depth of 10 yards, then ascertain the bottom, and afterward make a new contract for deepening the cut.

Official figures recently prepared and not yet published show the amount of freight transported across the isthmus by the Panama Railroad in 1883 to have been 222,000 tons, of which 92,000 tons were for account of the Inter-oceanic Canal Co. Mr. Chamberlaine states the exact (proposed) length of the canal at 76 kilometres (about 46.8 miles), the length of the Panama Railroad being about 46 miles.—*Panama Correspondence Boston Herald*.

New Block Signals.

Superintendent W. J. Murphy, of the Delaware Division of the New York, Lake Erie & Western road, has recently invented and will have patented a new system of signals. The signal consists of two disks, one red, the other white, for danger and safety respectively, which are of course replaced by red and white lights at night. The signals are suspended over the track and are operated by means of a wire rope running to the telegraph office. The signal remains constantly at danger unless changed to safety by the operator and only remains at safety as long as he has his hand on the rope.

Mr. Murphy has also invented what he calls a "rock signal" to be used in dangerous rock cuts along railroad lines where watchmen are stationed. The signal can be manipulated by the watchman quickly and gives the danger signal in both directions at once. These signals will be tried on the Delaware Division.

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Columbus, Hocking Valley & Toledo.

This company operates a line from Toledo, O., through Columbus and Gallipolis to Pomeroy on the Ohio River, 257 miles; a branch from Logan, O., to Athens, 26 miles; a branch from Logan to New Straitsville, 13 miles; the Moravia Creek Branch, 14 miles, and the Snow Fork Branch, 5 miles, a total of 315 miles, of which 309 miles are owned and 6 miles, from Toledo to Walbridge, are leased from the Pennsylvania Company.

The present company was formed by the consolidation of Columbus and Hocking Valley, the Columbus & Toledo and the Ohio & West Virginia companies.

The following figures are from a brief statement published for the year ending Dec. 31 last.

The stock is \$10,316,500. The funded debt consists of \$1,401,000 Columbus & Hocking Valley first-mortgage 7 per cent., and \$777,000 second-mortgage 7 per cent. bonds; \$2,474,000 Columbus & Toledo first-mortgage 7 per cent., and \$422,000 second-mortgage 7 per cent. bonds; \$1,584,000 Ohio & West Virginia first-mortgage 7 per cent. bonds; \$8,000,000 general mortgage 5 per cent. bonds. The interest charge is \$866,060 yearly.

The earnings for the year were as follows:

	1883	1882	Decrease.	P. C.
Freight.....	\$2,189,177	\$2,270,719	\$81,542	3.6
Passengers.....	441,705	455,083	13,378	3.1
Mail and express.....	42,034	43,090	1,056	2.5
Miscellaneous.....	106,476	116,936	10,460	9.0
Total.....	\$2,779,382	\$2,886,437	\$107,055	3.7
Expenses.....	1,655,570	1,752,735	97,165	5.5
Net earnings.....	\$1,123,812	\$1,133,702	\$9,890	0.9
Gross earn. per mile.....	8.823	9.152	329	3.7
Net.....	3.568	3.599	31	0.9
Per cent. of exps.....	59.56	60.72	1.16	

There was a considerable decrease in earnings, which was, however, very nearly equalled by the reduction in expenses.

The income account for the year was as follows:

Net earnings, as above.....	\$1,123,812
Donation accounts.....	37,693
Total.....	\$1,161,505
Interest on bonds.....	\$866,060
Interest on floating debt.....	35,725
Rental of line into Toledo.....	22,628
	\$944,413

Surplus for the year..... \$237,092
This surplus was equivalent to 2.3 per cent. on the capital stock. No dividends were paid during the year.

Illinois Central.

The report of the directors of this company for the year ending Dec. 31, 1883, has already been given (on page 164) and a summary of the rest of the report, which has just been published, is given below.

The road operated consists of the main line and branches in Illinois, 948.23 miles; the leased lines in Iowa, 402.16 miles, and the Chicago, St. Louis & New Orleans road, 577.60 miles, a total of 1,927.99 miles. Additions during the year are noted below.

The Chicago, St. Louis & New Orleans road, previously controlled, was operated under lease from Jan. 1, 1883. In the statements given the operations of that road are included for 1882 also, for purposes of comparison.

The equipment consists of 340 locomotives; 163 passenger cars (besides 6 old cars not numbered), 36 smoking, 17 sleeping, 2 chair, 10 combination smoking and baggage, 56 baggage, mail and express and 20 postal cars; 3,827 box, 50 Blue Line box, 4 powder, 188 fruit, 162 refrigerator, 730 stock, 111 combination grain and stock, 952 flat, 1,976 coal, and 169 caboose cars; 2 pay cars, 4 business cars, and 81 road and service cars.

The general account is as follows:

Stock.....	\$29,000,000.00
Funded debt.....	10,145,000.00
Chl., St. L. & N. O. stock.....	10,000,000.00
Insurance fund.....	18,000,000.00
March dividend.....	64,828.52
Income account.....	5,102,090.57
Total.....	\$74,051,919.09
Permanent expenditures in Illinois.....	\$36,294,293.14
So. Div.....	30,342,280.55
In Iowa.....	1,270,782.52
Supplies on hand.....	532,566.12
Insurance fund.....	64,828.52
Net assets.....	5,637,168.24
	\$74,051,919.09

Permanent expenditures in Iowa were increased \$80,487.10 during the year, by improvements charged to construction.

The item of net assets is made up of \$641,800 Chicago, St. Louis & New Orleans stock valued at 80; \$3,228,000 Chicago, St. Louis & New Orleans bonds at par; \$2,316,487.33 cash and cash assets, and \$115,341.25 assets in the Chicago office; a total of \$173,108.58, less \$535,940.34 liabilities.

The funded debt consists of \$2,500,000 sterling 6 per cent. bonds; \$5,050,000 sterling 5 per cent. bonds; \$1,600,000 Springfield Division 6 per cent. bonds; \$968,000 Middle Division 5 per cent. bonds, and \$27,000 past due and called bonds.

The Chicago, St. Louis & New Orleans funded debt consists of \$184,000 Mississippi Central 7, and \$709,100 8 per cent. bonds; \$4,191,000 New Orleans, Jackson & Great Northern 8 per cent. bonds; \$1,400,000 general 7 per cent. bonds, \$80,000 in 6 per cent. and \$11,432,000 in 5 per cent. bonds, besides \$3,900 past due and called bonds.

The earnings for the year were as follows:

	1883	1882	Inc. or Dec.	P. C.
Freight.....	\$8,604,958	\$8,460,461	\$144,497	2.4
Passengers.....	2,747,222	2,693,943	53,279	2.0
Mail and express.....	603,786	489,270	114,516	23.3
Sleeping cars.....	50,892	44,079	6,813	15.5
Rents, etc.....	897,885	973,655	75,770	7.8
Total.....	\$13,064,743	\$12,661,708	\$403,035	3.2
Expenses.....	6,435,271	6,071,448	363,823	6.0
Net earnings.....	\$6,629,472	\$6,590,260	\$39,212	0.5
Gross earn. per mile.....	6.773	6.694	79	1.2
Net.....	3.439	3.453	14	0.4
Per cent. of exps.....	40.25	47.95	7.70	

The mileage worked was 1,927.99 miles in 1883, and 1,908.65 miles in 1882.

The income account was as follows:

Net earnings, as above.....	\$6,629,472.19
Taxes paid in Illinois.....	\$494,455.53
Iowa.....	65,524.48
Rentals leased lines in Iowa.....	793,614.90
West & East and N. O. Belt.....	11,700.00
	1,365,315.00

Net balance..... \$5,969,156.91
Net receipts from Land Office..... 147,429.85
Interest, etc., received..... 352,805.19

Total net income.....	\$5,764,391.95
Interest, Illinois Central bonds.....	\$528,750.00
Bonds drawn for redemption.....	50,000.00
Interest, Chl., St. L. & N. O. bonds.....	1,080,203.50
Dividends.....	40,000.00
Dividends, Ill. Cent. stock, 10 per cent.....	2,900,000.00
Construction account, Illinois.....	461,432.27
Southern Div.....	171,067.39
	5,607,453.16

Surplus for the year..... \$156,938.79

The principal items charged to construction during the year were four iron bridges, one of them a drawbridge 296 ft. long over the Chicago River, new station buildings at several points, including two on the South Chicago Branch, 15.42 miles of additional sidings, and about 68 miles of new fencing. In all 102 miles of track were ballasted, of which 45 miles were on the southern division.

In renewals of track, there were laid 8,192 tons of steel rails and 425,637 new ties. There were also 13,986 feet of pile and trestle bridges.

During the year 11 locomotives were built to replace old ones worn out, and 13 new locomotives were added to the equipment.

During the year 1883 there were sold 42,947 acres of land to 798 persons for \$184,860, the average sale to each person being 53.81 acres, and the average price per acre \$4.30. Town lots were sold to the amount of \$2,101. The whole area of donated lands conveyed to date has been 2,324,619 acres, leaving 269,656 acres unconveyed. Of the entire land grant at the close of 1883 but 168,262 acres remained unsold, nearly all of it in the extreme southern part of Illinois. The gross receipts of the Land Department for sales and collections were \$167,399, and the expenses were \$19,970 last year.

The traffic for the year was as follows:

	1883	1882	Inc. or Dec.	P. C.
Train miles.....	2,926,236	2,781,198	144,738	5.2
Passenger.....	5,494,789	4,959,212	535,577	10.8
Service and switching.....	2,381,127	2,477,298	96,171	7.9
Total.....	10,792,152	10,218,008	574,144	4.7
Passengers carried.....	4,354,033	4,755,494	401,461	8.5
Passenger-miles.....	113,332,919	114,087,724	754,805	1.2
Tons freight carried.....	3,536,562	3,490,278	46,284	1.4
Ton-miles.....	604,632,667	570,215,021	34,417,646	6.0
Av. train load.....	30	41	11	2.4
Passengers, No.....	110	115	5	4.3
Freight, tons.....	2.43 cts.	2.35 cts.	0.08 cts.	3.4
Av. rate.....	1.43	1.48	0.05	3.4
Per pass.-mile.....				
Per ton-mile.....				

Omitting suburban trains, the average passenger rate was 2.60 cents, and the average passenger journey 48.78 miles. The short rides on the suburban trains out of Chicago (which carried 2,378,466 passengers, or much more than half the total number) reduced the average passenger journey to 26.02 miles. The average freight haul was 116.83 miles.

Of the ton-miles last year north-bound freight furnished 46.8 per cent., and south-bound 53.2 per cent. The earnings per train mile were: Passenger, 114.51 cents; freight, 167.43 cents; average, 122.07 cents; expenses, 60.13; net earnings, 61.94 cents per mile run, a decrease of 2.55 cents, or 3.95 per cent., from the preceding year.

The report of General Superintendent E. T. Jeffery says: "Since Jan. 1, 1883, the Chicago, St. Louis & New Orleans road has been operated as the Southern Division of this line."

"During the year the Middle Division was extended from Colfax to a junction with the main line near Bloomington, making the length of the division 131.25 miles."

"A double track, steel rail branch line, 4.76 miles long, commenced in 1882, was completed between Parkside and South Chicago."

"The second main track, which was built from Kensington to Homewood in 1882, has been extended thence to Monee, 10½ miles."

"The two main tracks, for the use of freight trains, between Chicago and Grand Crossing, commenced in 1882, are not completed, but will be finished and in service by May 1."

"The great flood of February last in the Ohio Valley demonstrated the necessity of raising our railway embankments from Mounds to the freight depot in Cairo, and from East Cairo to Wickliffe. This work was prosecuted with vigor, and the tracks were raised to a grade above the flood line; the embankments were also materially strengthened."

"To afford prompt movement of the growing traffic between the Illinois and the Southern Divisions a powerful transfer steamer is being built. She will have a capacity for 18 freight cars, six more than can be carried upon the steamer now in use."

"In view of the early completion of the Yazoo & Mississippi Valley road a large brick freight house was erected at Jackson, Miss., to meet the requirements of business. Corresponding, but smaller, houses were built at Wesson and Winona."

"The rapid growth of the fruit trade from the Mediterranean and the Gulf Coast has been met by the construction of an additional fruit shed, covering an acre of ground on the company's wharves in New Orleans."

"This company has, including the Kosciusko and Lexington branches, 577.60 miles of road south of Cairo, 948.23 in Illinois, and 402.16 in Iowa; total, 1,927.99 miles. There are in addition 63.27 miles of main tracks, principally in the vicinity of Chicago, and 312.44 miles of side tracks on the entire road, making an aggregate of 2,303.70 miles of tracks, of which 1,493.26 are in steel. This does not include the South Chicago Branch (4.76 miles), the Mound City Branch (2.87 miles), nor the lines being built in the state of Mississippi."

"About 1,000 ft. were added to the stone wall, commenced in former years, upon the west line of the right of way in Chicago."

"To equip the lines under construction in Mississippi 4 locomotives, 4 passenger cars, 1 baggage car and 250 freight cars, were sold to the Canton, Aberdeen & Nashville Co., and 2 locomotives, 1 baggage car and 150 freight cars, to the Yazoo & Mississippi Valley Co. New equipment built at the company's shops replaces that sold."

Union Pacific.

The report of this company for 1883 includes the main line from Omaha to Ogden, 1,042.4 miles; the Kansas Division from Kansas City to Denver, with Leavenworth Branch, 672.5 miles; the Cheyenne Division from Denver to Cheyenne, 106 miles; a total of 1,820.9 miles.

The company also controls and operates 2,960 miles of branch lines, of which a more particular description will be found elsewhere. The operations of these branch lines are not given in the report.

The equipment consists of 342 locomotives; 75 first-class passenger, 26 second-class passenger, 62 emigrant, 38 Pullman sleeping, 10 mail, 8 mail and baggage, 4 mail, baggage and express, 38 baggage and 18 express cars; 3,824 box, 25 fruit, 25 refrigerator, 732 stock, 167 combination stock, 619 flat, 1,156 coal and 189 caboose cars; 2 pay and 7 officers' cars, 21 derrick and tool, 56 water and tank, and 60 construction cars, and 6 pile-drivers.

The general balance sheet is as follows:

Liabilities.		
Stock		\$60,868,500.00
Funded debt	\$90,601,582.50	
Less held by trustees under K. P. con. mortgage	6,005,250.00	
		\$84,596,332.50
U. S. subsidy bonds and interest	47,407,552.95	
Floating debt, less assets	308,509.13	
Interest accrued, not yet due	795,914.17	
General income	\$8,255,121.21	
Income used for sinking fund	1,791,488.8	
Land and trust income	5,714,688.62	
Total	\$15,761,298.61	
Less deficit of U. S. requirements	582,310.50	
		15,178,988.02
Total		\$209,085,796.77
Assets:		
Cost of road and equipment	\$157,391,639.76	
Stocks and bonds of auxiliary roads, etc.	33,037,606.95	
Investments in auxiliary roads, payable in securities	4,811,124.41	
Other roads and bonds owned	690,801.32	
Coal mines, lands, etc.	431,570.51	
Securities of auxiliary companies in con. mort. trust	3,210,650.00	
Denver Extension sinking fund	289,000.00	
Union Pacific land grant assets	7,180,392.52	
Kansas Pacific "	3,033,711.30	
Total	\$209,085,796.77	

The amount of stock remains unchanged. The total funded debt decreased \$116,125; the amount held by the trustees under the consolidated mortgage decreased \$2,776,950, making a net increase of \$2,660,825 in the amount outstanding.

The company owned at the close of the year \$30,845,492 stock and \$24,444,230 bonds of leased and controlled roads; in addition to which the trustees under the Kansas Pacific consolidated mortgage held \$1,875,300 stocks, and \$3,158,000 bonds of those lines. This makes a total of \$61,313,022 of these securities, on which the return reported last year was \$2,066,682, or 3.37 per cent.

The United States subsidy bond account is made up of \$27,236,512 issued to Union Pacific; \$6,303,000 issued to Kansas Pacific, and \$32,093,369 accrued interest, less \$18,225,328 repaid by the company.

The statement of floating debt is as follows:

Notes payable	\$3,398,000.00
Accounts payable	1,414,653.93
Coupons, dividends and drawn bonds, including those due Jan. 1	2,421,106.17
Audited bills, pay-rolls, etc., for December	2,937,912.56
Total	\$10,141,372.66
Cash on hand	\$1,992,310.10
Station agents and foreign roads	1,954,044.45
Co.'s stock and bonds owned	2,099,433.58
Due from auxiliary roads	1,259,510.04
Fuel and material on hand	2,537,564.46
	9,832,863.56
Balance	\$308,509.13

If we deduct the balances due from auxiliary roads and the materials on hand, which can hardly be considered cash assets, the balance of floating debt is properly \$4,125,585.

The traffic for the year was as follows:

Train miles.	1883.	1882.	Inc. or Dec.	P. c.
Passenger	2,669,449	2,603,933		
Freight	4,803,933	4,811,124		
Total loco. miles	12,448,764	9,611,683	I. 2,837,081	29.5
Pass. car miles	19,162,418			
Freight car miles	109,449,000			
Passenger's car-miles	1,185,944	981,430	I. 204,514	20.9
Passenger-miles	14,965,839	157,537,336	D. 8,563,497	5.4
Tons freight car	2,833,587	2,101,636	I. 481,651	23.0
Ton-miles	745,989,015	732,791,054	I. 13,197,961	1.8
Av. train load:				
Passengers, No.	56			
Freight, tons	155			

The earnings per train mile were: Passenger, \$2.28; freight, \$2.97; average, all trains, \$2.73; expenses, \$1.38, and net earnings, \$1.35.

There were 904,453 tons coal (an increase of 166,243 tons, or 22.6 per cent.) produced from the company's mines, at a cost of \$1.42 per ton. Of this coal 265,114 tons were sold for \$1,243,106, the remaining 639,339 tons being used by the company.

The average rate per passenger mile was 3.13 cents. The average rate per ton-mile was as follows, in cents:

	1883		1882	
	Including coal.	Excluding coal.	Including coal.	Excluding coal.
Local	1.94	2.40	2.19	2.64
Through	1.60	1.60	1.60	2.33
Pacific Coast	1.33	1.33	1.33	1.17
Total				
East-bound	1.43	1.76	1.51	1.77
West-bound	2.07	2.07	2.10	2.14
Average	1.73	1.93	1.89	2.03

Of the total ton-miles last year local business furnished 58.4 per cent.; through business 16.3, and Pacific Coast business 25.3 per cent. Of the whole movement 52.4 per cent. was east-bound and 47.6 per cent. west-bound.

The earnings for the year were as follows:

	1883.	1882.	Inc. or Dec.	P. c.
Passengers, cash	\$4,545,348	\$3,054,344	D. \$508,996	10.1
Passengers, govern.	113,768	143,386	D. 29,618	20.7
Freight, cash	12,506,582	13,543,841	D. 947,259	7.0
Freight, govern.	742,958	361,648	D. 18,690	5.2
Freight, company	1,328,751	1,496,678	D. 167,927	11.2
Mail	739,133	746,516	D. 7,383	1.0
Express	705,262	748,932	D. 43,670	5.8
Car service	42,265	149,321	D. 107,056	71.8
Rent of buildings	38,082	41,185	D. 2,393	5.4
Miscellaneous	549,493	538,033	I. 11,460	2.1
Total	\$21,002,542	\$22,823,484	D. \$1,821,342	8.0
Expenses	10,254,541	10,727,049	D. 372,508	3.5
Net earnings	\$10,748,001	\$12,096,435	D. \$1,348,434	12.0
Gross earn. per m.	11.534	12.534	D. 1,000	8.0
Net earn. per m.	5.848	6.043	D. 793	12.0
Per. cent. of exps.	49.30	47.00	I. 2.30	

The decrease in expenses was in maintenance of way and cars; there was an increase in conducting transportation due to increased train mileage. The report says:

"The aggregate amount of passenger and freight traffic for the year 1883 exceeded the amount for the previous

year, the diminished earnings having been caused by a reduction in rates. The total number of passengers carried was 1,185,984, being an excess of 21 per cent.; and of tons of freight carried, 2,583,285, being an excess of 23 per cent. over the year 1882.

"The business depression in Colorado for a greater part of the year, together with a division of Montana traffic with the Northern Pacific Railroad, and the entire diversion from our lines after Sept. 15 of the passenger business between Oregon and Washington Territory and the East, caused a large loss in the passenger business of the Union Division. During the last seven months of 1883 there was a reduction of 25 per cent. from the rates previously in force on all the company's lines in Kansas, but the local traffic resulting from the development of the country adjacent to the railway considerably exceeded the amount of this loss, and but for the reduction in rates in Colorado and Utah, arising from the competition of rival lines and the failure to agree upon rates, the gross earnings of the company for the past year would have been largely in excess of the year previous. The latter of these causes has now been remedied, and with the maintenance of present rates, and the continued increase of traffic, the gross and net earnings for the year 1884 should show very favorably when compared with the past year.

The result of the year was as follows:

Net earnings	\$10,748,001.26
Interest and dividends collected on investment securities	2,076,682.09
Total surplus earnings	\$12,714,683.37
Interest on bonds	\$4,607,711.17
Discount interest and exchange	139,630.33
Sinking fund requirements	476,488.75
Amount due to the United States on the business of the year	1,869,058.33
Premium paid on bonds redeemed, etc.	38,233.10
Dividends on stock, 7 per cent.	4,290,788.00
	\$11,452,809.71
Surplus for the year	\$1,261,873.66

Expenditures for new construction were \$101,177; for new equipment (less old cars and engines sold) \$184,546, making a total of \$285,723.

RENEWALS AND REPAIRS.

"During the year 1883 there were laid in renewal of tracks 9,237 tons of steel rails, 2,221 tons of iron rails, and 612,134 cross ties of oak, cedar or pine. The iron rails were laid in side tracks only. One iron truss bridge, four wooden truss bridges and 313 pile bridges were rebuilt, aggregating 23,860 ft. in length. Repairs were made to 775 bridges, 161 station buildings and 85 tenement houses and hotels, at a cost of \$393,682.

"During 1883 there were turned out from the company's mill at Laramie 6,154 tons of iron rails and 8,511,137 pounds of bar iron, spikes, bolts and nuts. The continued fall in the price of steel rails during the past year had reached a point in June, when it was no longer deemed advantageous to re-roll iron rails, and at the expiration of that month the business of manufacturing rails for side tracks, and for subsidiary lines of the company was suspended. Since that date the rails taken out of tracks have been rolled into bar iron, used in the manufacture of cars and into material for track fastenings."

LAND DEPARTMENT.

"The sales of company lands in 1883 amounted to a larger sum than in any previous year since the sales were commenced, and exceeded the sales last year by the sum of \$2,308,888.

"The total number of acres sold during the year was 1,166,849, for the gross sum of \$4,081,134. The number of purchasers was 3,814, who bought an average of 305.8 acres each, at the average price of \$3.50 per acre.

"Favorable crops in Kansas and Nebraska, and the partial failure of crops in Manitoba and in Wisconsin, turned the tide of emigration to lands adjacent to the lines of the company, and their superior character secured purchasers. A large quantity of land sold for farming purposes is within a belt of country which, until recently, was regarded as a region where crops could not be raised without an expensive system of irrigation.

"It is a very favorable feature that, besides the direct income from the sale of these lands at advanced prices, their settlement and cultivation will afford an amount of local business for the railway of a very extensive and profitable character. All lands granted to the company have been sold for the distance of 200 miles west of the Missouri River."

The unsold lands on Dec. 31, were 13,422,000 acres. Of the total issue of \$10,400,000 land grant bonds \$5,811,000 have been cancelled, leaving \$4,589,000 outstanding, to offset which, the trustees hold \$2,202,108 cash, and \$5,177,981 land contracts, or \$2,591,084 in all over the amount of the remaining bonds.

LEASED AND CONTROLLED LINES.

The system of roads owned and leased, exclusive of the 1,820.9 miles owned directly, was as follows, with the additions made during the year:

	Miles, Dec. 31, 1883.	Added in 1883.	Total, 1883.
Omaha and Republican Valley	187	27	214
Omaha, Niobrara & Black Hills	98	14	112
Marysville & Blue Valley	38	38	76
Colorado Central	327	327	654
Echo & Park City	32	32	64
Utah & Northern	482	482	964
Oregon Short Line	572	317	889
Greely, Salt Lake & Pacific	41	41	82
Lawrence & Emporia	31	31	62
Junction City & Fort Kearney	70	70	140
Salina & Southwestern	35	35	70
Golden, Boulder & Caribou	6	6	12
Denver & Boulder Valley	27	27	54
Georgetown, Breckenridge & Leadville	2	2	4
Central Branch U. P. and leased lines (operated by the Missouri Pacific)	388	388	776
Kansas Central	165	165	330
Denver, South Park & Pacific	300	36	336
Manhattan, Alma & Burlingame	28	28	56
Manhattan & Blue Valley	4	4	8
Salt Lake & Western	54	54	108
Nevada Central	93	93	186
Total	2,960	396	3,356

In addition to the above, the company has large proprietary interests in the St. Joseph & Western (now operated as an independent line), 251 miles, and in the Solomon Railroad, 57 miles. In addition to the 396 miles completed as above, grading in advance of track laying was completed as follows: Oregon Short Line, 24 miles; Omaha & Republican Valley, 21; Omaha, Niobrara & Black Hills, 16; Georgetown, Breckenridge & Leadville, 6½; Denver, South Park & Pacific, 21½ miles.

The interest and dividends received on the securities owned by the company amounted to \$2,088,682. No other statement of their earnings is given in the report. The monthly statements published by the company, however, include the earnings of leased lines, whether of the entire mileage or not is not stated. If from the December statement we take

the earnings given in the report for the line owned, we have the following:

	1883.	1882.	Increase.	P. c.
Earnings	\$8,758,452	\$7,540,643	\$1,217,809	16.1
Expenses	6,315,630	5,334,901	980,729	18.4

Net earnings.....\$2,442,822 \$2,205,742 \$237,080 10.8

This may be taken as at least an approximation to the direct results from the leased and controlled lines, without taking into account their effect upon the main line in the increased business brought to it.

The report says: "At the date of the last annual report the Oregon Short Line was open for business to Shoshone, Idaho, 821 miles from the point of its connection with the Union Pacific. Up to Jan. 1, 1884, the road had been operated for an average length of about 420 miles; the net earnings of its business since April 1 being only \$57,000 less than the interest on the bonds issued for its construction. This is regarded as a very favorable result.

"When it became evident that the Oregon Railway & Navigation Co. would be unable to complete its line to a junction with the Oregon Short Line at the date anticipated, it became less important to complete the Oregon Short Line by that time. The grading was completed, however, by Jan. 1, 1884, and at this date (March 1), there remain but 21.2 miles of track to be laid.

"It is understood that arrangements are in progress for hastening the completion of the Oregon Railway & Navigation Co.'s railroad to the Junction with the Oregon Short Line.

"The completion of the Northern Pacific Railroad to Portland gave to the Union Pacific, by the Utah & Northern Railway, a rail connection to Oregon and an interchange of business mutually advantageous has taken place. Until the completion of the Oregon Railway & Navigation Co.'s line to a connection with the Oregon Short Line, this all-rail route to and from Oregon and Washington Territory can be utilized with valuable results. A branch line from the Utah & Northern Railway at Market Lake to the Yellowstone Park, is of easy construction, and when completed it will add a large passenger traffic to the Union Pacific, the Oregon Short Line, and to the Utah & Northern.

"It was deemed advantageous that an independent line should be constructed to Leadville, in place of paying to the Denver & Rio Grande Railway the large sum demanded for the use of 43 miles of its track, by which the connection to Leadville has hitherto been made. Accordingly, a branch 34 miles in length has been built, extending from Dillon to Leadville, and on Feb. 6 the first locomotive passed over the route. A short spur, 7½ miles in length, has also been built to give direct connection between the Denver, South Park & Pacific line and its Gunnison Extension. The branch, 16 miles in length, extending from Gunnison to the coal mines on Ohio Creek, has been completed, by which an ample supply of fuel of excellent quality has been obtained."

GENERAL RESULTS.

The report says: "An examination of the subjoined statements will disclose the following resulting balances of income for the year, which are equal to the percentages enumerated below on the share capital of the company:

Surplus of general income, after allowing for dividends at the rate of 7 p. r. cent.	\$1,261,873.66
Surplus of land and trust income, 4.995 per cent., or	3,040,467.09
Surplus carried to income used for sinking funds, 0.783 per cent., or	476,488.78
Total	\$1,778,829.53

Deduct deficit in special U. S. income, 0.183 per cent., or.....111,732.01

Net additions to the income accounts, over and above the 7 per cent. dividends paid during the year, 7.698 per cent., or.....\$4,667,076.62

"It will also be seen that during the year 1883 the amount of the investment accounts was increased by the sum of \$4,181,520, and that there was a further increase of \$2,907,345 in the land department assets.

"During the past year the company has been subjected to losses of earnings from causes beyond its control. The volume of business was largely greater than that of the year preceding, but the company was compelled, by a competition that persisted in carrying freight at a loss, to surrender the transportation of a large amount of competitive freight, or to accept a small profit on the business. To strengthen its position, and to obviate, if possible, a recurrence of similar unwise action by rival lines, the company formed an alliance known as the 'Tripartite' with railway lines extending eastward from the Missouri River. By concurrent action it is believed that greater stability in rates will be insured, and the interests of the railways, and of the business communities along their lines, will be promoted.

"The relations of the company with the United States have not changed during the past year. The principal matter in dispute between the government and the company is in relation to the amount which shall be allowed to the company as compensation for the carrying of the mails. Under the decision of the United States Supreme Court the company has a charge against the United States for this service covering the period from February, 1876, after which date the company gave notice that it would no longer acquiesce in the rate prescribed by the Postmaster General to Dec. 31, 1882, which exceeds the allowances of the Postmaster General for the same period by upwards of \$3,500,000. The Post Office Department and the company have not been able to come to any arrangement in respect of this controversy, and the matter has therefore been allowed to go to the Court of Claims for the purpose of having the 'fair and reasonable rate' contemplated under the company's charter established. The contention of the company is that until this amount of mail compensation has been definitely ascertained it will not be possible for the government or for the company's officers to state correctly the net earnings of the company's road, as contemplated under the Thurman act, nor to offset against the percentage of those net earnings the correct amount of government transportation, which, under the act referred to, is to be deducted before any cash balance is ascertained or required to be paid. By reference to the report of the Commissioner of Railroads of 1883, it will be seen that the total cash payment claimed by the government to Dec. 31, 1882, under the least favorable construction of the term 'net earnings' under the act of 1878, is \$1,727,743. Against this balance claimed to be due by the government, the company has the claim above referred to of about \$3,500,000. It is not probable therefore that, under any decision that the Court of Claims may reach, a rate will be found which will so far reduce the amount of our claim as to make it less in amount than the claim of the government. On the other hand, it is probable that upon an adjustment of the accounts a large balance will be found to be due to the company. It may be added that only a small portion of the current charge is being entered in the earnings accounts of the company, so that no appreciable diminution of the current income would ensue were the whole of the controverted claim for the year thrown out of the year's income.

"The continued increase of local traffic and the rapid settlement of government and of company lands along its lines of railway are the surest guarantee of the future prosperity of the company."



Published Every Friday.

EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

COURSE OF EARNINGS AND TRAFFIC ON THE UNION PACIFIC.

The statements of the earnings from different sources of the Union Pacific Railway Company which we noticed last week, and which only were published in the newspapers, showed no very great change in anything. There was the considerable decrease of 7 per cent. in freight earnings (omitting company freight), which is nothing remarkable, however, or would not be if it had not occurred in a year when the crops on the company's railroads were extraordinarily large; and there was a decrease of 10½ per cent. in passenger earnings. The sum of these decreases was \$1,504,563, which is a large amount, to be sure, but not 8 per cent. of the Union Pacific's total earnings. But when we come to examine the details of the earnings from through and way business in each direction, given in the full report, we find some very significant changes.

Omitting the earnings from the carriage of the company's own materials, which are a delusion, as they must all be charged off as expenses on the other side of the account, the total freight earnings for the year were:

	1883.	1882.	Decrease.	P. c.
Freight earnings.....	\$12,939,540	\$13,905,400	\$965,950	7.0

During 1883 the competition for Pacific coast freight increased, and during a large part of the year the greater part that goes from the Atlantic states was carried by the Southern Pacific. It might be supposed, then, that it was in this business that the chief decrease in freight earnings occurred, especially as the Union Pacific had a large increase during the year in the mileage of subsidiary roads that feed it, and the country in Kansas and Nebraska supplied exceptionally large crops to be carried. The earnings of the subsidiary roads, it must be remembered, are not given in the report; only those of the 1,821 miles of road owned by the Union Pacific Railway Company. Now, the report gives separately the crops in Pacific freight as follows:

	1883.	1882.	Decrease.	P. c.
Pacific Freight:				
East-bound.....	\$757,924	\$843,042	\$85,118	10.1
West-bound.....	1,754,583	1,903,431	148,848	7.8
Total.....	\$2,512,507	\$2,746,472	\$233,966	8.5

Thus we see that that not one-fourth of the total decrease in freight earnings was due to a falling off in the Pacific coast business, and that the decrease in the west-bound Pacific freight, which is that for which the competition has increased most, has been less in proportion than in the east-bound, which is very largely subject to the will of the Central Pacific, which has willed that a larger proportion should go by the southern route. It may also be noticed that the shipments from the Pacific are comparatively unimportant, affording only 30 per cent. of the total Pacific freight earnings, and less than six per cent. of the total Union Pacific freight earnings, so that the road could get along very well without any part of this business, which it is unable to command with the same certainty as the west-bound business, because it has no line of its own on that coast. And the whole Pacific freight earnings were but 19.4 per cent. of this com-

pany's total freight earnings in 1883 and 19.7 in 1882.

The comparatively small decrease in the earnings on the west-bound Pacific coast business is probably due to the fact that the larger part of that freight comes, not from the East, where the Southern Pacific gets the lion's share, but from the West, where the Southern Pacific gets comparatively little, though it may get the California haul on a larger amount now that the Atlantic & Pacific is in operation.

This Pacific coast business is all through for the Union Pacific, but it gives all its other through freight earnings separately, without defining what it means by "through." We take it that it includes all shipments to Denver and all points beyond, and to Utah; probably to all points on the Oregon Short Line, and properly to all on the Utah Northern and other Utah roads. Now these through freight earnings were:

	1883.	1882.	Decrease.	P. c.
East-bound.....	\$751,026	\$1,037,300	\$286,273	27.6
West-bound.....	1,303,457	2,895,769	1,592,312	58.4
Total.....	\$1,954,483	\$3,933,118	\$1,978,635	50.2

Here, then, we find an astounding change. The through freight other than that to and from the Pacific coast yielded only one-half as much in 1883 as in 1882, and the amount of the decrease in this business was nearly two millions—a very serious loss even for a company like the Union Pacific, the more so as most of it must have come from net as well as gross earnings, for it is not probable that there has been any decrease in the train service by which this freight is carried. This is the result, doubtless, of the completion of the Chicago, Burlington & Quincy to Denver in June, 1882, first becoming fairly effective in 1883, which diverted a large portion of the decreased total of Colorado traffic; of the completion of the Denver, Rio Grande & Western to Salt Lake City and Ogden, which in connection with the Burlington diverted a large amount of Utah traffic from a part of the year; and of the extension of the Northern Pacific across Montana, giving most of that territory a more direct connection than that afforded previously through the Utah & Northern and the Union Pacific. More than all, probably, it was the result of the lower rates caused by competition. These, much of the time, were war rates caused by undue competition and left no profit to any one; but it is not probable that the old rates will ever be reached again for this traffic, as the new roads represent but a fraction of the Union Pacific's capital per mile, and will be abundantly supported at lower rates, if they get a moderate amount of traffic.

It will be noticed that but 38.4 per cent. of the through freight earnings were from east-bound freight last year, and but 26½ per cent. in 1882, and that the decrease in the east-bound was but 27½ per cent., while that in the west-bound was 58½. Colorado, Utah and Montana produce comparatively little freight to ship to the East, except cattle, and these do not go to any extent from the western termini of the road, and so are not through freight. The product of mines of precious metals is perhaps the chief through freight eastward, while nearly all supplies, including lumber, come from the East. But, further, of late years there has been a great deal of railroad construction in the Far West, and the materials form a large amount and can usually be charged high rates. Much less was built in connection with the Union Pacific in 1883 than in 1882, and this may have had much to do with the enormous decrease reported in through west-bound freight earnings.

Taking the above with the Pacific freight we have the following as the total through freight earnings:

	1883.	1882.	Decrease.	P. c.
Through freight:				
East-bound.....	\$1,508,950	\$1,880,441	\$371,491	19.7
West-bound.....	2,958,040	4,799,200	1,841,160	38.4
Total.....	\$4,466,990	\$6,679,641	\$2,212,651	30.1

For all this freight, substantially, the Union Pacific is subject to competition. There was a great deal more competition than usual last year, but probably not so much as there will be this year, since the Northern Pacific and the Denver & Rio Grande and the Atlantic & Pacific were competitors for the through freight only a part of last year. Very likely there was less through freight to carry last year than in 1882, and with a larger number of competitors and lower rates we find the Union Pacific suffered a decrease of 30 per cent. in its earnings from it, amounting to \$2,200,000, which is nearly 2½ times the decrease in its total freight earnings.

There is left for examination the local freight earnings, which, exclusive of coal, were:

	1883.	1882.	Decrease.	P. c.
Local freight:				
East-bound.....	\$3,466,447	\$2,386,274	\$1,079,173	44.8
West-bound.....	4,373,925	4,201,947	171,978	4.1
Total.....	\$7,840,372	\$6,588,221	\$1,252,151	18.8

Here at last we find what the good crops in Kansas and Nebraska have done for this company. They have given it an increase of more than a million (44½ per

cent.) in its earnings on local freight shipped eastward; and we find the growth here where the road is situated much like other roads, subject to the competition of railroads not very distant from it and for some time exposed to such competition, there having been no considerable change from the previous year in this respect. The previous year, by the way, was partly a good and partly a bad year; the crops of 1882 were all that could be wished, but the railroads had the wheat and oats to haul for less than half of the year and the corn for but a single month, and the crops of 1881, which afforded the traffic for the other parts of 1882, were extremely bad. Even in this local freight, however, we see that the earnings from west-bound exceed those from east-bound freight, which seems surprising, as the bulk of the latter must greatly exceed that of the former—the lumber and merchandise and supplies going west and the grain, hogs and cattle coming east.

A separate statement is made of coal, which is local freight, and is carried chiefly from the company's own mines near the western end of its road, and on which, therefore, it gets a long haul when sold at stations in the agricultural country on its lines, as most of it is. This is not a large part of the freight earnings, but it is interesting as showing to what an extent the country on its lines, which has scarcely any local fuel, is supplied from the Far West, the mines being close to the Utah line. The coal earnings were:

	1883.	1882.	Inc. or Dec.	P. c.
Coal:				
East-bound.....	\$602,483	\$507,050	+\$95,433	19.0
West-bound.....	59,695	120,577	- 60,882	75.4
Total.....	\$662,178	\$627,627	+\$34,551	0.7

The coal earnings have always been chiefly from east-bound shipments, which is due partly, doubtless, to the long haul in that direction, though as it was brought into competition with the Iowa coal, it had to be carried at low rates in that direction, while in the other a very high rate could be obtained. Last year we see that the earnings from the west-bound shipments were not 5 per cent. of the whole, and were wholly insignificant, which may be due to other roads supplying Utah and Montana with a better article—the Denver & Rio Grande having coal and coke on its own line.

We may then summarize the course of the freight earnings of the Union Pacific from 1882 to 1883 by saying there was

	In local freight an increase of.....	\$1,242,150,	or 18.8	P. c.
In coal.....	4,511,	or 0.7		
In Pacific freight a decrease of.....	233,958,	or 8.5		
In other through freight a decrease of.....	1,978,635,	or 50.2		
Resulting in a total decrease of.....	965,950,	or 7.0		

A very large gain in local earnings, but an overwhelming decrease in through earnings.

The percentage of the total freight earnings from each was:

	Local.	Coal.	Pacific.	Other through.
1883.....	60.6	4.9	19.4	15.1
1882.....	47.5	4.5	19.7	28.3

Including coal, 65.5 per cent. of the earnings were from local freight last year, against 52 per cent. in 1882. The growth in local earnings is of very great importance to the company, especially now that the competition for the through business has become so formidable and may become more so. The local freight is, to be sure, not wholly beyond the reach of competition, but it is much more firmly held, now that the company controls about 3,000 miles of subsidiary lines, than it was a few years ago, when the duplication of the line to Ogden might have exposed it to competition for nearly all its traffic with a company able to make a profit with net earnings of \$1,500 a mile or so.

The total freight traffic was:

	1883.	1882.	Increase.	P. c.
Ton-miles.....	745,989,015	732,791,054	13,197,961	1.8

Thus the decrease of 7 per cent. in freight earnings must have been due wholly to a reduction in the average rates received, and we find, indeed, that there was a reduction from 1.90 to 1.77 cents per ton per mile, leaving the rate, which not long ago was a very high one, about equal to the Chicago & Northwestern's rate no longer ago than 1878, and the Milwaukee & St. Paul's in 1880. The traffic and average rate on different kinds of traffic have been:

	1883.	1882.	Inc. or Dec.	P. c.
Local freight:				
Ton-miles east.....	282,498,062	190,507,689	91,990,373	48.3
" " west.....	152,882,813	130,374,040	22,508,773	9.7
Total.....	435,380,875	320,881,729	105,499,146	32.0

This freight was 58.4 per cent of the whole last year but only 45 per cent. in 1882.

The average rate per ton per mile on this freight decreased from 2.19 cents in 1882 to 1.95 cents last year—11 per cent. The average is brought down by the extremely low rate at which the company carries coal from its own mines eastward, which last year was only 0.555 cent per ton per mile, while the average of other east-bound

local freight was 1.99 cents. The average on west-bound local freight was 2.88 cents, and as high on coal as other freight. The increase in the movement of east-bound local freight, we see, was nearly seven times as great as the increase in the west-bound. On this latter freight the average rate decreased from 3.10 to 2.88 cents per ton per mile; on the east-bound (including coal) from 1.440 to 1.525.

The movement of Pacific coast freight was:

Pacific freight:	1883.	1882.	Decrease.	P. c.
Ton-miles east.....	56,033,215	64,931,634	8,898,419	15.2
Ton-miles west.....	132,554,372	168,816,916	36,262,544	21.5

Total.....188,587,587 233,748,550 45,160,963 18.3

This shows a very large decrease in the movement, but, what is remarkable, the decrease is larger in proportion than the decrease in through freight earnings; for, in spite of the increased competition, the average through Pacific rates, both east-bound and west-bound, were *higher* in 1883 than in 1882, the east-bound rate increasing from 1.30 to 1.34 cents per ton per mile, and the west-bound from 1.128 to 1.324 cents.

This, however, may occur in spite of a general reduction in rates, strange as it may seem. If the Union Pacific carried a smaller proportion of low-class freight, this might result. If, for instance, there were but two classes, one yielding 4 cents and the other 1 cent per ton per mile, and the same movement of each, the average rate would be $2\frac{1}{2}$ cents. If now the low-class freight should all be diverted to some other road, and the high-class rate reduced to 3 cents, the road would receive an average rate of 3 cents instead of $2\frac{1}{2}$, in spite of a reduction of 25 per cent. in its freight tariff. Now, the Union Pacific is the most direct route for Pacific freight, and is less likely to lose high-class than low-class freight, which usually can better afford delay.

This Pacific freight was 25.3 per cent. of the company's total freight traffic last year, against 32 per cent. in 1882.

The movement of other through freight was:

Through freight:	1883.	1882.	Decrease.	P. c.
Ton-miles east.....	52,354,057	61,080,652	8,726,595	14.3
Ton-miles west.....	69,686,496	103,001,123	33,314,627	35.5

Total.....122,040,553 164,081,775 42,041,222 37.8

This is a great decrease, but not nearly so great as the decrease in the earnings from the traffic, which we have seen was 27½ per cent. on east-bound and 58 per cent. on west-bound freight, indicating a great decrease in the average rate, which actually we find to have fallen from 1.698 to 1.303 cents per ton mile on the east-bound and from 2.68 to 1.726 cents on the west-bound freight. The last year's rates are not to be called very low, but they are low for the Union Pacific.

This through freight was 13.8 per cent. of the total freight traffic in 1883 against 23.5 per cent. in 1882.

We see here that the great decrease both in the amount of freight carried and in the average rate received was in through freight westward; and this is a natural result of the increased competition suffered. The rivals of the Union Pacific are in position to command much west-bound traffic at the points of shipment east of the Missouri; but they are not nearly so well placed as the Union Pacific to command shipments at their origin in Utah, Idaho, Montana, etc. It is able to maintain its rates on a large part of these shipments, but on a much smaller proportion of the west-bound, and as the result we see a decrease of but one-seventh in the traffic and less than one-quarter in the rate east-bound, while the reduction is more than one-third in the traffic and 35 per cent. in the rate west-bound.

It is doubtless this enormous loss on through west-bound freight that has made the company anxious to make a close alliance with railroads that do control a large amount of this traffic at its origin.

So much for freight. The passenger earnings are less important, and the changes in them, though considerable, have not been so enormous as in some parts of the freight traffic. The passenger earnings were:

Passenger.....	1883.	1882.	Decrease.	P. c.
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\$4,659,116 \$5,197,770 \$538,654 10.3

The earnings from Pacific travel are not given separately, but the total through passenger earnings were:

Through passengers:	1883.	1882.	Decrease.	P. c.
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East-bound.....\$929,271 \$1,198,518 \$269,247 22.5

West-bound.....1,437,516 1,638,518 200,902 12.3

Total.....\$2,366,787 \$2,837,036 \$470,249 16.6

A decrease in one-sixth in all, which is about seven-eighths of the whole decrease in passenger earnings. It is noticeable that the decrease is proportionately much the greater in east-bound travel, which yielded but about 39 per cent. of the passenger earnings last year, against 42 per cent. in 1882. There was much irregularity in the through fares from the Pacific last year, but there was also more competition for the business. Therefore we should expect a smaller number

of through passengers and lower average fares to combine to make this reduction in earnings. And an examination of the statement of passenger traffic shows that this was the case, the through passenger mileage and average through rates having been:

	1883.	1882.	Decrease.	P. c.
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Mileage.....82,030,350 92,650,170 10,619,820 11.5

Average rate.....2.858 cts. 3.082 cts. 0.177 cts. 5.8

The reduction in the rates, therefore, was comparatively trifling, which may have been due to a large decrease in the immigrant travel, which is carried at much less than the average rates, and this very likely was the case. The excess of west-bound over east-bound passengers was 15,088 last year, against 22,420 in 1882, and this indicates the immigration *by this road* to the places at and beyond its western termini.

The local passenger earnings were:

Local passengers:	1883.	1882.	Decrease.	P. c.
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East-bound.....\$1,052,736 \$1,064,010 \$11,274 1.0

West-bound.....1,239,494 1,296,724 57,230 4.4

Total.....\$2,292,230 \$2,360,734 \$68,504 2.9

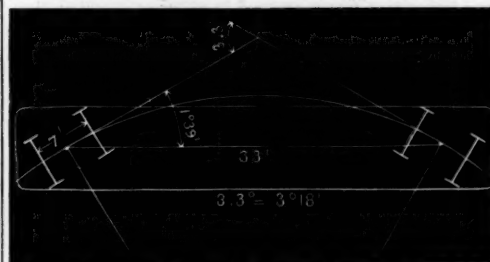
It is somewhat remarkable that there should be a decrease in local passenger earnings in a year when there was so large an increase in local freight earnings, and when Kansas and Nebraska people should have been exceptionally well able to travel; but the statistics of travel show that there was actually an increase in the local travel last year from 64,868,166 to 66,933,489 passenger miles, or 3 per cent., which, however, was *wholly in east-bound travel*.

The decrease in local passenger earnings was therefore due to lower average rates, and we find, actually, that the average local fare fell from 3.639 cents in 1882 to 3.425 in 1883.

The excess in the number of local passengers westward over the number eastward indicates very closely the immigration to the country *along* (not beyond) the road. This excess was 21,007 last year, against 44,064 in 1882.

CHECK-CHAINS THAT DO NOT CHECK.

The breaking of a piece as long as one's hand from the flange of a car wheel last Sunday night caused a passenger train, fortunately nearly empty, to run off the track and two cars to fall over a bridge into the Harlem Kills. It is for just such cases that check-chains are provided; and in this case it would seem that such chains should have kept the wheels of the truck so nearly in line with the rails that the cars should not have gone over. Now it appears that this



car was duly provided with check-chains, and yet the cars were thrown over.

The question arises: Do not check-chains, as usually attached, contain within themselves the elements of their own destruction in the amount of play, or slew, which they permit before they come to a bearing? There is reason to suspect that they do, and that one reason for this is that car-builders have not stopped to compute the exact amount of play which is legitimately required for passing curves and turn-outs, but have, perhaps, allowed "plenty" by guess, until it has become a custom—and it certainly is the custom—which no single car-builder cares to break through.

As nearly as can be judged by the eye from the other rolling-stock of the company concerned the amount of slew which the check-chains permit is about ten inches, or perhaps even a foot, and we judge from 8 to 12 inches to be not far from a general average. The chains seem to be firmly attached on the cars now running on the same line, and as strong as is usual. Yet here was a case of broken flange close to a bridge, where, if anywhere, check-chains might have rendered important assistance in holding the truck to the ties, at least for a time, until it had passed over the bridge, and where they seem to have proved wholly useless.

Now the amount of play in check-chains *necessarily required* on the road in question for all legitimate purposes of passing curves and turn-outs is but little if any over *one inch* for passenger cars of ordinary length, such as those to which the accident occurred. Had the check-chains been so attached as to permit only that amount of play, and been equally firmly attached, we may say roughly, yet approximately, that they would have had ten or twelve times as much chance of proving serviceable, since the strains to which they would have been subjected would have been

only one-tenth or one-twelfth as great; the amount of lateral force to which the truck is subjected, tending to cause it to slew further, being, approximately, directly as the number of inches of unrestricted slew permitted. Of course it would be folly to attempt to compute theoretically the exact amount of force exerted, tending to break the check-chains, in case of a run-off, whether the slew permitted be much or little. They are subjected to a series of bumps and jerks testing the construction severely under any circumstances; yet it is a mathematical certainty that each one of these bumps and jerks will only strain the check-chains one-tenth or one-twelfth as much, with a slew of one inch as with a slew of ten or twelve inches.

Let us see how much play is really necessary. We illustrate in the figure below the mode of computation for a 10° curve. The length from centre to centre of trucks rarely exceeds 33 ft. in ordinary passenger cars. The wheel-base of the trucks on the road in question is 7 ft.

Then, as is evident from the figure, the total amount of curvature included between the centres of the trucks will be $3.3^\circ = 3^\circ 18'$, and the angle at which the centre-line of each truck will stand to the centre-line of the car body will be just one-half of this, or $1^\circ 39'$. The play between wheels and rails which always exists would modify this slightly, but that we neglect. Any combination of reversed or compound curvature, it will be found on trial, would decrease this angle and cannot possibly increase it, provided the sharpest curve is 10°.

These data given, we have only to multiply half the wheel base of the truck by the chord of an angle of $1^\circ 39'$ to a radius of one foot (which is 0.0288), and we have 0.1008 ft or 1.5 in. as the *necessary* amount of play to pass such a curve. If the curve be only half as sharp as this, or 5°, we only need half as much play. If it be twice as sharp, or 20°, we need twice as much. The amount of play required also increases directly with the length of the truck wheel base and directly with the length of the car body between truck centres, so that if we have a car body 50 ft. long between truck centres, and a truck wheel-base of 12 ft., we need $0.04368 \times 6 = 0.26178$ ft., or about $3\frac{1}{4}$ in. play. The latter may be considered as about the maximum required for the longest cars in the United States on a 10° curve. But any such maximum of course is a matter of no moment in such a question as the mode of attaching check-chains; for each class of cars, or to speak more correctly, each individual car, is a question by itself.

A question which immediately comes up is in respect to passing through switches and turn-outs with any such limited play. This is a much less important question with passenger rolling-stock than any similar one would be with freight cars, for two reasons: (1) passenger cars are mainly confined to the home road and not exchanged with others to any extent, except in the case of sleepers (and even then only within fixed and known limits), and (2) there is a certain proportion of the very roughest sidings—on which the sharpest curves usually occur—where passenger cars are not likely to have to go even in case of accident. Therefore, if some firm road and its immediate connections have no sharper curves on any main line or siding than 8° or 10°, it is a matter of no moment to them for fixing the slack of check-chains that out in the Rocky Mountains, or even in the Alleghenies, there are roads with curves of 20° or 30°.

We have at this moment no very accurate information as to the sharpest turn-outs on various lines. The radius of the turn-out curve varies directly with the number (or proportion) of the frog, and the number of the frog varies with the taste and fancy of the engineer or roadmaster, apparently; for certainly there can be no other good reason for such a multiplicity of numbers as are in use. A statement of the number of each kind of frog in use on the New York, Pennsylvania & Ohio Railroad, which comes to our hand as an illustration, is as follows, with the corresponding radius and degree of the turn-out curves:

Proportion or number of frog.	Turn-out.	Radius in feet.	Curve.
MAIN LINE FROGS.			Degree.
1 to 6.....	26	340	16°48'
1 to 7.....	60	406	12°19'
1 to 8.....	32	606	9°27'
1 to 9.....	218	763	7°31'
1 to 10.....	162	951	6°07'
1 to 11.....	204	1,127	5°02'
1 to 12.....	3		
1 to 22.....	2		
Total.....	707		
SIDE TRACK FROGS.			
1 to 6.....	84		
1 to 7.....	157		
1 to 8.....	84		
1 to 9.....	157		
1 to 10.....	6		
1 to 11.....	144		
Total.....	632		
1 to 4.....	156		37°30'
1 to 5.....	241		24°

From this table it will be seen that the sharpest turn-

out curve on that one road, either on main line or sidings, is about 17", requiring 17 ft. or about 2 in. play in the check-chains of ordinary cars. To this should be added, probably, about half an inch, or perhaps an inch, for the variations caused by play of gauge or irregularities of line, and we then have the utmost that the exigencies of regular service require on that line. We say "perhaps," because we do not regard it as certain that it would not be better to allow a little strain to come on the check-chains in such exceptional cases, rather than increase the chances of failure in cases of derailment by allowing otherwise needless slack. To use 3 in. slack instead of 2 in. increases by about 50 per cent. the chances of breakage and failure, and if the check-chain be strong enough to have any chance of holding a derailed truck in line it ought to be strong enough to slightly modify the position of the truck wheels on the rails, in rare and exceptional instances, without injurious strain. If it is not strong enough for this purpose the car will be better without it.

But whether this be so or not the point which we especially wish to call attention to, as before stated, is that the amount of play allowed in the chains as usually attached is not one, or two, or three inches in excess, but is away beyond the utmost requirements of practice, and should at least be modified, apparently, so as to leave only an inch or two to spare, if the chains are intended to have a fair chance to be effective.

Not improbably the origin of this excessive slack in the check-chains may be found in the custom, so general in the earlier days of railroading, of running passenger cars around sharp curves in city streets. Many of these curves which now remain are so sharp that it is necessary to detach the check-chains, even now, to enable the car to pass around them. If the slack were reduced within narrower limits, so as to be adapted to the regular requirements of service, it would, of course, be still more necessary to detach them in such cases, and it would seem a simple matter to require this to be done also in all cases when backing into strange sidings or into certain specified sidings, or into sidings designated by a certain post or sign, rather than to court accident by the present looseness; especially if we bear in mind that a derailment from over-tight check-chains, if it should occur at such points, would never be under circumstances liable to cause a serious catastrophe, which is precisely what the present style of check-chains do endanger.

A difficulty which will at once occur to the practical car-builder who has the effects of leverage and the laws of theoretical mechanics connected therewith clearly in mind is, that if the check-chains—hanging as they now do from a side-sill almost vertically over the point of attachment to the truck—were to be shortened up so as to be almost taut in their normal condition, as what we have said would require, they would encounter an almost irresistible strain when the truck began to slew, because their direction would be almost at right angles to the force which they had to resist; so that our last state would be worse than the first. There is great force in this objection, but it is a mere detail to obviate the difficulty. The check-chains might of course be attached to the centre-sills instead of the side-sills, if it were desirable to do so, and might for the most part be a single long rod with a few links for the necessary play at either end.

These suggestions cover one of the few possible improvements tending to make travel by rail safer which it is perfectly easy for any one to test by experiment at trifling cost and definitely settle. We hope some one may do so and give our readers the benefit of his experience. Let some condemned wheel have the flange purposely and badly broken, or let a piece of rail be removed from the outside of some curve, and the car be tested on it at gradually increasing speed. This might involve some little trouble in re-railing and some injury to the car, but the cost would be well repaid if definite results of any kind were determined, favorable or unfavorable, to the soundness of these suggestions.

The Completion of the Mexican Central.

The completion of the main line of the Mexican Central Railway, the last rail on which was laid on Saturday last, the 8th inst., is an event of no common importance, and perhaps of still greater future significance as marking the beginning of a new era in our industrial history. It is a long and important line, 1,223 miles, and was built at a cost of some \$30,000,000, including some work on branches. The list of longer and more important lines which have been undertaken and built by one management, on this continent or any other,

is a short one. But its especial significance lies in the fact that, with some trifling exceptions, more apparent than real, it is the first important public enterprise ever undertaken and carried through by Americans outside of the limits of their own country. Taken in connection with the numerous other enterprises of the same kind in Mexico, now in progress—on which in the aggregate an even larger sum of money has been expended, perhaps, than on the Mexican Central—it constitutes a strong indication that a great many Americans are beginning to feel strong enough to take the whole world for their oyster and to compete with England and other nations for the privilege of opening it. The future progress of this tendency may be slow. It may be interrupted by long and disastrous intervals. An unfortunate outcome of our first attempts in this line would render this, in fact, almost certain. But, nevertheless, we seem to have clear indications that Brother Jonathan begins to find his own wide limits too narrow a field for his enterprise, and is making ready to follow the example of our English cousins by going forth unto all the world and preaching his uneasy gospel of thrift and progress to every creature.

That Americans have certain great advantages which should enable them to take a leading part in such work seems evident. Practice makes perfect. The American certainly has had considerable practice in the art of getting as much "development" for a dollar as it is possible to get out of it, and it must be admitted that his success has not been small. Trained as he has been in the sharp school of necessity, he ought to be able to do such work better even than the English, who are the only people who have shown, so far, much capacity for it, and who have certainly done some wonderful work, as well as made some wonderful blunders.

The room for such foreign enterprises is still great—almost boundless. A beginning has hardly been made. The American has heretofore been handicapped by no end of work to do at home and scanty means to do it with. Those obstacles are fast passing away. So long as the chief materials of construction are costlier here than in England we shall be at some disadvantage, truly, but it should not take long for American capitalists, engineers and contractors to learn to avail themselves of the resources of the world for the exploitation of undeveloped foreign countries. With a surplus of capital in this country, and certainly a surplus of forces trained in railroad construction, in a fair field, with no favor, the American should be able so to win the confidence of foreign peoples as to take a leading part in their industrial development.

For this reason, no less than from their intrinsic importance, the progress of the Mexican Central and its kindred enterprises will be watched with curious interest. The rock on which the Englishman has split, or at least struck, in conducting such work, would seem to be the fear and dislike with which he has contrived to inspire foreign people. This should be a great help to American rivalry in several important foreign countries. Whether the American will do any better, or whether inherited tendency will be too strong for him, is a doubtful matter. We should fancy that he might do better, but in view of the fact that the nations which do adapt themselves to foreign peoples, and thus keep their good-will, seem to be wholly without the faculty of successfully pushing their fortunes abroad, one is led to doubt whether this would be any blessing, and whether the Englishman's weakness may not, after all, be his strength. The Frenchman among Indians is an Indian. The German among Mexicans is a Mexican, and rather out-Herods Herod in his adoption of certain vices of their character—a fact which is the more curious because the German among Americans becomes an American, and a thoroughly good and enterprising citizen. The American has not been tested much as yet, but so far as he has been tested in Mexico we do not believe, as at present advised, that he is endangering his future success by any alarming amount of popularity, or by doing in Rome too much as the Romans do. Not to speak of graver matters, the Mexican is learning in many little ways that another and different civilization is intruding upon him, and will not give way to him. It may be a higher civilization, but he thinks it is a lower one, and freely says so. He has been accustomed to his little siesta after dinner. From 12 to 3 p. m. have been sacred hours—sacred to digestion and sleep. Germans and other foreigners have given in to this custom. The American thinks it an especially good chance to get a few hours monopoly of trade and insists on keeping his store open, the indignant native tradesmen hoping against hope to get a law passed to forbid this. The Mexican has been accustomed to—in this latitude

it is better to call it an absurd—courtesy of manner. He may be ready to lie, but he is never ready to be rude, and his hat comes off on the slightest occasion. It comes off far less often than it once did to the "gringo," and the Mexican fancies that he is giving a pointed slight, but the "gringo" does not see it in that light. He is hardly aware that he has a hat. The Mexican has heretofore taken a full hour for his meals, and even the English railroad from Vera Cruz to Mexico gave in to this weakness. The American promptly cut it down to 40 minutes and then halved that. The unhappy Mexican has no escape and he is now taking unwilling lessons in the noble art of bolting a full meal in twenty minutes. He is an imitative animal and filled with the desire to see Mexico abreast of other nations. Probably in time he will master the art and perceive that it is a necessary incident to progress. But in the meantime he does not like it. He is still only partly civilized and does not believe in that kind of progress.

This seems a trifling matter, but there is indubitable evidence that this one little circumstance, and others like it, has stirred up more feeling against Americans, or helped to do so, than the unobserving "gringo" has any idea of. At any rate, it is a fact that lies upon the surface in Mexico that Americans are by no means so popular as they were. We see no reason to believe that this feeling has grown or will grow to any dangerous extent—certainly not to any such extent as to affect personal safety or national relations. Mexicans are as orderly to-day, perhaps, and as sincerely anxious to see better days dawn in their country as any people on the globe, and we should regard the latter possibility as highly improbable. Whether there may not be enough of the feeling to affect an American company which desires to make money in Mexico—and to make money not only in the hour which cometh, but in the hour which now is—is another matter. We fancy that there may be, or we should not have spoken of it.

It is a sound general principle that a railroad company, like any one else with something to sell, should have the good-will of the buyers, and the more of it they can succeed in obtaining the more money they are likely to make. But it is a matter of sad experience to many managers in America that, even in the states, railroad companies are not apt to be over-popular after they are done with paying out money and try to take in some. An American manager in Mexico has a little harder task among a people who know nothing about railroads nor much about business, and who may be over-ready to put the worst construction on the best intentions.

The effect of the early September frost on the quality of the last corn crop seems not to have been sufficiently appreciated. When the Department of Agriculture reported last December that the crop of 1883 was 1,551 millions of bushels, against 1,617 mill. in 1882 and 1,195 in 1881, it seemed that the crop could not be a very bad one, though a reference to the 1,717 millions grown in 1880 and the 1,754 millions in 1879, from 6,000,000 acres (9 per cent.) less ground, showed that it was not a good one. But the decrease in the feeding value of the corn caused by the failure of so much of it to ripen properly was probably much greater than the decrease in actual bushels. This week we have reports from the State Statistical Agent of Minnesota who says that only 5 per cent. of the corn there was sound, and that the other 95 per cent. was worth 56 per cent. less than sound corn, which would make the state crop of 16,000,000 bushels (as he estimates it) equivalent to only 7,500,000 bushels of sound corn. At the same time we have a report from the Ohio State Board of Agriculture which says that the number of bushels of corn produced last year was about 60 million bushels, against 73½ millions by the preliminary report of the United States department, and an average of about 100 millions for ten years previous. Further, the state authority says that 38 millions of the 60 were unsound corn and worth 62½ per cent. less than sound corn, which would make the whole crop equivalent to but 36 million bushels of sound corn. In these two states, then, we have to deduct 32½ million bushels from the yield on account of quality. And neither of these is a leading corn growing state, and Ohio should not have suffered more than Indiana or Illinois or so much as Iowa. A similar deduction (40 per cent.) from these three states on account of quality would amount to no less than 180 millions of bushels, and counting in Michigan and Wisconsin also (which suffered as much from frost as any states, probably,) we have in these seven states a reduction of 230,000,000 bushels on account of quality—equal to more than one-seventh of the whole crop of the United States. This, however, would exaggerate the damage to the crop if compared with most previous years, because there is

usually some soft corn, and there was a good deal in 1882; not because of early frost, for the frost was unusually late, but because of a cold summer, which had a great effect in 1883 also. But the damage to the last crop was probably three times as great as in 1882 or any other recent year; and it is to be noticed that the seasons when the crop is largest are those when most of it is sound, as the same causes that increase the yield mature the corn. The converse is not quite true, as a drought that greatly reduced the yield, as in 1881, would be likely to make all the grain ripe and hard, while reducing the number and size of ears and grain.

This great reduction of marketable corn is likely to be felt, as it doubtless has already been felt, to a marked extent by the railroads north of the Ohio and in Iowa, and is indicated by the exceptionally small number of hogs packed at Chicago and elsewhere in the West during the past winter season. An exceptionally large crop of corn in Kansas and Nebraska has done something to counterbalance the loss further east, but not all the railroads profit by this.

The grain receipts and exports of New Orleans fluctuate in a somewhat remarkable way. We have heretofore shown that there seems to be very little connection between them and the shipments down the Mississippi. At least the New Orleans receipts are often considerable when there are scarcely any river shipments. This year, while at the Eastern Atlantic ports the receipts have been extraordinarily small, at New Orleans they have been nearly as great as last year, and larger than in any other except 1880, and they are a larger percentage of the total Atlantic receipts than they have been in any other year except 1880. The following gives the number of bushels of grain received at New Orleans and the percentage of the total Atlantic receipts for the eight weeks ending Feb. 23, for six successive years:

1877.	1880.	1881.	1882.	1883.	1884.
1,575,214	3,103,006	1,605,580	584,625	2,020,220	1,841,291
6 1/4 p.c.	15 p.c.	9 1/4 p.c.	4 p.c.	9 p.c.	13 1/4 p.c.

It might be supposed that the comparatively larger receipts this year were due to heavy river shipments; but no river shipments were reported in the first five of these eight weeks this year, and for the eight weeks they were but 614,185 bushels this year, against 653,320 in 1883 and 956,410 in 1882. Thus there has been no unusual river supply. What the export demand has been we may know by the fact that New Orleans exported 1,314,029 bushels of grain in these eight weeks this year, against 1,854,395 in 1883 and only 60,096 bushels in 1882.

Thus its exports this year fell off 540,000 bushels, while its receipts fell off but 179,000, and its excess of receipts over exports for the eight weeks was 527,262 bushels this year, against 165,825 last year, and 524,529 bushels in 1882.

Thus New Orleans seems to have received largely for domestic consumption in 1883 and this year, but much less in 1882. This is just what was to be expected: the South had a miserable grain crop in 1881, and a bad one last year, but a magnificent one in 1882. The short crop last year has made necessary considerable receipts for home consumption this year.

It remains true, however, that the exports of grain have fallen off less at New Orleans than at most other places, though there they are 29 per cent. less than last year.

The receipts of grain (not including flour) at the eight Northwestern markets during January and February for five successive years have been, in bushels:

1880.	1881.	1882.	1883.	1884.
32,193,178	23,852,148	31,813,435	39,658,669	40,135,425

Thus their receipts this year have been a little more than last year and larger than ever before—a fourth more than in 1880 and 1882, and 70 per cent. more than in 1881.

The percentage arriving at each market has been in these two months, for five years:

	1880.	1881.	1882.	1883.	1884.
Chicago	40.2	40.4	41.4	46.0	51.5
Milwaukee	9.0	10.2	11.7	8.1	7.2
Toledo	9.7	7.7	5.5	8.6	8.0
Detroit	2.9	4.8	2.8	5.2	4.9
Cleveland	3.1	3.2	1.9	2.3	1.2
St. Louis	25.6	19.4	21.4	19.4	16.2
Peoria	9.4	14.3	14.8	9.2	11.2
Duluth .....	.....	.....	0.5	1.0	0.5

Total

The proportion of the receipts at Chicago was exceptionally large this year, while the proportion at St. Louis was unusually small. Taking Chicago and Milwaukee together, and comparing with St. Louis and Peoria together, we have the following percentages:

	1880.	1881.	1882.	1883.	1884.
Chicago and Milwaukee	49.3	50.6	53.1	54.1	58.7
St. Louis and Peoria	35.0	33.7	36.2	28.6	27.4

The receipts at Atlantic ports in January and February for five successive years have been:

1880.	1881.	1882.	1883.	1884.
24,772,882	23,358,048	16,539,385	27,808,470	15,626,960

Thus the Atlantic receipts this year were smaller

than in any other of the five, though the Northwestern receipts were larger, and were nearly 44 per cent. less than last year.

The excess of the Northwestern receipts over the Atlantic receipts for these two months has been:

1880.	1881.	1882.	1883.	1884.
7,420,206	494,100	16,274,050	11,850,199	24,508,465

The difference of course is larger this year than ever before—more than twice as great as last year, and 50 per cent. greater than in 1882, and the receipts of the Atlantic ports this year were but 39 per cent. of the Northwestern receipts this year, while they were 70 per cent. of them last year, 50 per cent. in 1882, 98 per cent. in 1881, and 77 per cent. in 1880—in all indicating, what other statistics have indicated, that there has been this season an exceptionally heavy movement of grain from the Northwestern farms this season, but that increased consumption in the West and the country between the West and the seaboard, has required an unusual amount, while there has also been an unusual accumulation of stocks in Western elevators, which, however, accounts for but a small part of difference between Northwestern receipts and Atlantic receipts.

The percentage of the total Atlantic receipts arriving at each port in these two months has been:

	1880.	1881.	1882.	1883.	1884.
New York	35.4	35.8	53.1	37.5	40.2
Boston	11.8	13.9	19.1	12.5	14.1
Portland	2.7	2.4	3.2	3.1	5.2
Montreal	0.4	0.8	0.7	0.7	2.1
Philadelphia	15.2	13.9	11.5	12.6	11.9
Baltimore	20.0	22.0	7.5	23.2	12.8
New Orleans	14.5	11.2	4.9	10.4	13.1

New York's and Boston's percentages are larger, and Philadelphia and Baltimore's smaller, than in any other year, except 1882, when the country from which Philadelphia and Baltimore receive chiefly had very little grain of any kind to spare. The last harvest also was in many respects unfavorable for them, but they have received much more than in 1882.

The Boston & Lowell Railroad Company, the first railroad corporation chartered in Massachusetts, has always claimed that it was exempt from legislative control, except so far as specially provided in its charter, and that it is not subject to the general laws relating to railroads which are not consonant with its charter. This corporation is the only one of the early established railroad companies that has not been brought directly under the provisions of all general laws, and when new legislation was asked for by this company repeated attempts have been made in the Legislature to bring it also under the general laws by incorporating such a provision in the act asked for, in order that the acceptance of the act by the corporation might settle the question. But the Boston & Lowell Company has generally had influence enough in the Legislature to defeat any obnoxious provision; or, if an act containing it was passed, it was not accepted by the company and was consequently void.

At the present session of the Legislature the Boston & Lowell corporation has asked for authority to consolidate with certain roads now leased and operated by it. The management of the road at the present time is very far from popular, and the influence of some of the people residing on its line was at once exerted to secure the incorporation into the bill authorizing consolidation of a proviso bringing the company clearly under the general laws. There was good reason to suppose that such a proviso would pass, in spite of any opposition on the part of the corporation, and it did not very strenuously oppose the proviso as applied to the consolidated company, and a bill was reported in that form. But the corporation had two strings to its bow. The same bill which authorized the consolidation of the several companies also provided that in lieu of such consolidation the Boston & Lowell corporation might purchase the securities of the other roads, and for that purpose might increase its capital stock. That being done, all the advantages of consolidation would be secured, though not under the terms first named. To this part of the bill, as reported by the Committee on Railroads, the proviso bringing the corporation under the general laws did not apply; and here arose in the House something of a contest between the representatives of the public and those sustaining the claims of the corporation. The former insisted upon applying the proviso to both parts of the act, and the latter contended that it should apply only to the new corporation formed by the consolidation. The popular side was finally victorious in the House, and the bill so amended is now before the Senate.

Some good lawyers are of opinion that the Boston & Lowell corporation is now subject to all the provisions

of the general railroad laws. It has enjoyed privileges and exercised powers which are granted by the general laws, but are not found in the company's charter, as, for instance, the operation of the road and fixing the rates of fare and freight, the charter only authorizing the collection of tolls for the passage over the road of the vehicles of other parties. In other respects also it has practically admitted that it is subject to many provisions of the general law, even such as are contrary to the spirit, if not the terms, of the charter. The question, however, has not yet come before the courts; but when it does, in view of the quasi public character of railroad corporations, and the drift of judicial decisions throughout the country, it is at least doubtful if the Boston & Lowell corporation will be found to stand on any different footing from that of all the other railroad companies of the state of Massachusetts.

Last Sunday night an accommodation train on the Harlem River Branch of the New York, New Haven & Hartford Railroad was thrown from the track as it was approaching a bridge about half a mile from the Harlem River station, and the middle car thrown bottom up into the Harlem Kills, and the rear car on its side partly in the water. On search a portion of the flange of one of the wheels was found about 300 feet from the place where the derailment occurred. The car inspector reports that the fracture is clean and shows no sign of a flaw; and that the wheels were not more than three months old; another employé of the company testifies that the wheels under the cars were carefully inspected the day of the accident and found all right. Having supplied a new wheel of approved manufacture, and had it properly tested, the managers of the road claim that they have done all that was possible to prevent an accident of this kind, and that it, therefore, was one that could not have been prevented.

Probably the manufacturers and advocates of steel-tired wheels will not admit that the company had done all it could or should to provide a safe wheel, and there is little doubt that if the wheel had been a steel-tired one instead of a cast-iron one, this particular accident would not have occurred. The question of the material for wheels, however, will not be settled quite so simply. In Europe accidents from tires breaking on getting loose are not infrequent; and cast-iron wheels are exempt from this danger. Almost every improved apparatus gives new occasion for accidents. If the use of it reduces the total number of accidents it justifies itself nevertheless. The breakage of cast-iron car wheels is of common occurrence, but accidents to passenger trains caused by such breakage have not been numerous, and we recall very few cases where many persons have been injured by an accident so caused. But this case calls attention to the chief objection to cast-iron wheels. A new wheel, from a manufacturer of reputation is carefully tested, and directly after the test a piece of the flange breaks off with no apparent cause. While chilled cast-iron is often and when properly made generally an admirable material for wheels and abundantly strong, it sometimes fails, and apparently we have found no tests which will enable us to reject the wheels which are liable to fail.

Of the 41 railroads that have reported their February earnings so far, only nine show a decrease in their total earnings, and in the aggregate they have an increase of 9 per cent. Their mileage was 11 per cent. larger this year, and their average earnings per mile decreased from \$334 to \$328—both very small amounts, which is due chiefly to the fact that few of the roads with large earnings per mile have reported as yet, and partly to the fact that earnings were unusually light in February both years. In 1883 78 roads suffered a decrease of 4 per cent. in their average earnings per mile compared with 1882, and 15 out of 35 that have reported this year had a decrease. Thus the Burlington, Cedar Rapids & Northern, the Milwaukee & St. Paul, the St. Paul & Omaha, the Chicago & West Michigan, the Cleveland, Akron & Columbus, the Green Bay & St. Paul, the Peoria, Decatur & Evansville, and the Manitoba, which show an increase this year, nevertheless had smaller earnings than in February, 1882; while the Central Pacific, the Chicago & Eastern Illinois, and the Detroit, Lansing & Northern, which had a decrease last year, suffer a further one this year. There are few large gains except where there has been an increase in mileage; the exceptions are the Cincinnati Southern (suffering from a flood both years), the Flint & Pere Marquette (16 per cent.), the two Florida roads, the Peoria, Decatur & Evansville and the Wisconsin Central.

French Experiments on Effectiveness of Coal in Locomotives.

M. George Marié, the Engineer of the Paris & Lyons Railroad, has lately made some interesting experiments on the consumption of fuel on locomotives per unit of the work performed. It is always a difficult matter to determine the exact amount of work done by a locomotive, for though the indicator diagrams may be practically correct, they may not give a fair average of the very varying power exerted by a locomotive. In ascending a steep incline, however, the work of lifting the train forms the principal part of the duty of the locomotive; and the height of the incline, and the weight of the cars can be more readily and accurately ascertained than the average amount of friction due to axle boxes, curves, speed, etc. Taking for example, an incline of 132 ft. to the mile, we know that a tractive force of 50 lbs. to the ton is necessary to overcome the force of gravity, but the frictional resistances may vary from say 3 lbs. to 10 lbs. per ton. In the one case the resistance is a definite known quantity and in the other a variable one, affected by weather and many other factors which can hardly be taken into consideration. If the total work done by the engine was wholly exerted in overcoming the force of gravity, the net effective horse power could be readily ascertained, and Monsieur Marié therefore tried his engine on mountain inclines, where the resistance due to gravity was large in proportion to the resistance due to friction, etc. The total resistance could thus be determined with tolerable accuracy, as an error of 10 per cent. in ascertaining the frictional resistance would only amount to 2 per cent. of the total resistance. The results arrived at are therefore little influenced by errors in the dynamometer or indicator. Unfortunately the method applies to moderate speeds only, as high speeds cannot be obtained on the sharp curves of the mountain lines.

The following are the main results of these trials, which took place on the heavy grades leading to the Mount Cenis tunnel:

Water evaporated by pound of coal.....	lbs.
Consumption of coal per indicated horse power.....	3.88
Ratio per effective horse power.....	3.27
Pressure of steam per sq. inch.....	1.28
Average speed per hour during trials.....	17.04

Dimensions of Locomotive:
Cylinders, 21½ in. by 26 in. stroke.
Drivers, 40½ in. diameter.
Heating surface—fire-box..... 104
" " tubes..... 2,045

Total.....	2,149
Grate area.....	23.4
Weight of engine and train.....	396,474 lbs.

The line selected for the trials was 17½ miles long, rising 1,709 ft. in all, and giving an average gradient of almost exactly 100 ft. per mile. The steepest grade was, however, 151 ft. per mile. The coal was of good quality, yielding 14,600 British thermal units when burnt in oxygen. The amount of ash was 6.5 per cent., and the coal also contained 1 per cent. of moisture. The average point of cut-off during the experiments was at 19 per cent. of the stroke.

Monsieur Marié also made some trials with a Corliss condensing engine, and found that as compared with a theoretically perfect engine working under the same conditions as to quality of fuel, pressure of steam, etc., calculations as to the relative efficiency of the Corliss and locomotive give the following results:

	Corliss.	Locomotive.
Efficiency of boiler.....	64	65
Efficiency of engine.....	53	54

Therefore, according to these experiments, the locomotive compared to a theoretically perfect locomotive, is quite as good as a Corliss condensing engine compared to a theoretically perfect Corliss engine. The large amount of heating surface and the great degree of expansion permitted by the unusual size of the cylinders contributed, no doubt, to this favorable result. The piston speed was equal to that of an engine with 68-in. drivers and 24-in. stroke, running at 26.4 miles per hour. While this speed is too fast for much loss by leakage or condensation of steam, it is sufficiently slow to avoid any great amount of wire-drawing. The trials, therefore, were conducted under tolerably favorable conditions.

Some other experiments made by M. Regray on express engines on another French railroad show more economical results, the average consumption being 3.01 lbs. per indicated horse power, and the minimum 2.48 lbs. These experiments were conducted in a totally different manner, and as small Belgian coal was used, it was probably of inferior quality. Both sets of experiments appear to have been carried out with great skill and care, and the results, therefore, probably indicate pretty accurately the economy possible in French engines. As, however, the boilers and valve gear differ in many respects from those used in this country it is possible that widely different results might be obtained here.

The Chicago through rail shipments eastward for the week ending March 1 were exceptionally small—the smallest so far this year. For five successive years the shipments of the week have been, in tons, by the complete report:

1880.....	1881.....	1882.....	1883.....	1884.....
42,776	53,211	47,928	60,385	37,778

The shipments this year were thus 22,607 tons (36½ per cent.) less than last year, and also less than in any of the other three years.

The percentage of the total shipments carried by each road this year and last was:

	1884.	1883.		1884.	1883.
C. & Grand T.....	16.1	8.4	Ft. Wayne.....	15.1	19.7
Mich. Cen.....	11.9	27.4	C. St. L. & Pitts.....	3.5	11.9
Lake Shore.....	17.9	23.5	Balt. & Ohio.....	7.8	9.1
Nickel Plate.....	10.7	10.7	Chic. & At.....	17.8	16.1

The percentages this year differ materially from those

reported to the Board of Trade for the same week, which we published last week. The total is not greater than that given by the Board of Trade report (as it usually is), but 6,397 tons less; and the differences between the actual percentages of through freight carried and those reported to the Board of Trade were:

	Actual.	B. of T.		Actual.	B. of T.
C. & Grand T.....	16.1	10.5	Ft. Wayne.....	15.1	19.7
Mich. Cen.....	11.9	18.3	C. St. L. & P.....	3.5	5.8
Lake Shore.....	17.1	17.9	Balt. & Ohio.....	7.8	10.0
Nickel Plate.....	10.7	10.7	Chic. & At.....	17.8	16.1

It must be remembered that it is not quite the same thing that the two reports intend to cover, the report to the Board of Trade including only flour, grain and provisions, while the pool report includes all freight; while on the other hand the pool report includes only through freight—such as goes as far east as Toronto, Buffalo, Pittsburgh, etc., while the other report covers local as well as through shipments. Flour, grain and provisions make so nearly the whole of the eastward shipments that the error on that account should not be great, but some of the roads must carry more local freight than others.

On the whole, the pool report does not indicate a general restoration of rates so strongly as the Board of Trade report, of which we spoke last week. The Nickel Plate, it is true, is shown to have no longer a very great excess of business, but the Grand Trunk increased its already very large excess. The unusually large percentage of the Chicago & Atlantic is not undesirable, as that road is already short.

For seven successive weeks the Chicago shipments have been:

	Week ending—				
Jan. 19.	Jan. 26.	Feb. 2.	Feb. 9.	Feb. 16.	Feb. 23.
65,559	41,095	40,727	41,834	38,732	45,014
					37,778

We may now be within three weeks and probably are, at most within seven weeks, of the opening of lake navigation. It is not at all probable that there will be any considerable shipments to the seaboard again this season at a 30-cent rate. But as the shipments are largely for interior consumption and do not go through to the seaboard at all, and as the through shipments might be very little increased, however low the rate, there may be no haste to reduce it.

Though the accumulation of grain at Chicago is unusually large that of provisions is unusually small for the close of the packing season. At the end of February the stock of hog meats there were about 80 millions of pounds, against 111 millions last year, the decrease being 28 per cent. The number of hogs packed in Chicago in the four months of the winter packing season, ending with February, was one fifth less this year than last and the smallest since 1877.

The very first week of March, compared with last year, shows an important decrease in the earnings of the Northwestern railroads, which, we said last week, was likely to occur, not so much because earnings would be very small this year, but because they were very large last year. The Chicago, Milwaukee & St. Paul reports a decrease from \$409,824 to \$346,000 (14 per cent.), and it earned (with 665 miles more road) but \$10,273 more than in 1882; and the Chicago & Northwestern has a decrease from \$418,900 to \$372,800, or 12½ per cent.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Cape Fear & Yadkin Valley.—Extended northwest to Buffalo Creek, N. C., 14 miles.

Jacksonville, Tampa & Key West.—Extended from Green Cove Springs, Fla., southward to Palatka, 27 miles. Gauge, 3 ft.

Savannah, Florida & Western.—The *Florida Division* is extended from Rowland's Bluff, Fla., east by south to Newnanville, 32 miles.

This is a total of 73 miles of new railroad, making 286 miles reported to date for 1884. The total track reported laid to the corresponding date for 12 years is as follows:

	Miles.		Miles.
1884.....	286	1878.....	215
1883.....	320	1877.....	102
1882.....	323	1876.....	285
1881.....	427	1875.....	99
1880.....	733	1874.....	180
1879.....	204	1873.....	348

These statements include *main track only*, no account being taken of second tracks or other additional tracks or sidings.

Railroad Policy in England.

V.—STATE CONTROL OF RATES.

In England, as everywhere else, there are two distinct complaints against the railroads—complaints of exorbitant charges, and complaints of discriminations. When railroads were first chartered people feared the first evil, and hardly thought of the second. They tried to prevent exorbitant charges by a very definite system of maximum rates and fares. For almost every conceivable sort of goods the charter prescribed how much toll the railroad might take for use of the way, how much for furnishing the locomotive power, and how much for furnishing the cars; also how much it might charge for all these services combined. It is worthy of notice that these rates were not based upon cost of service, but mainly upon the value of the goods, and that certain articles when destined for export were allowed a much lower maximum rate than the same article when destined for home consumption. In the charter of the Stockton & Darlington Railway the maximum for coal in general was 4d., but for export coal only ½d.

It is hardly necessary to say that these provisions were of

little effect. There were several reasons for this: 1. The railroads could carry much cheaper than was at first supposed, and most of the charter provisions were useless on this account alone. 2. They were generally based upon equal mileage rates, so that for long distances they were very much too high. 3. They did not, according to the view maintained by the railroads, include any terminal charges, so that the companies might make any rate they pleased for these services. 4. The classification adopted in the charters was a very arbitrary one, if, indeed, it could be called a classification at all; it was quite different from that in use on any railroads at the present day. It is thus almost impossible to tell under what clause of the charter many articles belong. 5. The provisions concerning maxima and other tolls are quite inconsistent with one another, and this inconsistency gives the companies a chance to act as they please. 6. Finally, some companies take the position that when they grant special facilities, as distinct from merely reasonable ones, they are not bound by their maxima; for instance, in the milk traffic, which is almost as fruitful a subject of discussion in England as with us.

Under all these difficulties it is a mere chance if the prescribed maxima can do any one either good or harm. They are occasionally made a ground of complaint concerning local rates for short distances; there was a great deal of evidence before the committee of 1881 that companies had exceeded their maxima on these rates, but very little could be done about it. Sometimes also articles have risen in value greatly since the time of the charter. The charter maxima for manure were very low; and an Aberdeen Company brought suit to compel the railroad to carry highly valuable artificial fertilizers under the old manure rates per ton. The railroad tried to take refuge under the toll clauses, but was not all allowed to, and the Aberdeen company won their case. But instances like this are infrequent. Every careful student of the question, from Morrison in 1836 down to the committees of 1872 and 1882, has come to the conclusion that fixed maxima are of next to no use in preventing extortion.

The plan of trying to keep down rates by limitation of dividends has been often proposed, but they have had too much sense to believe in it. Government revision of rates has been tried to a slight extent, but the authorities abstained from putting the new maxima very low, and the revision really amounted to nothing. The right to revise rates, quite independently of any charter provisions, has always been insisted upon by Parliament, but even Prof. Hunter, the Simon Sterne of English investigations, admits that "it would require an extremely strong case to justify interference." There is no present likelihood of this right being exercised.

The subject of maxima is really a subordinate one. It is the question of differential rates that most agitates the public mind; and it comes up in almost exactly the same forms which it takes in America. One set of low rates arises from competition of different routes, another from special contracts to develop business.

As we saw in an earlier article, the low differentials for competing points do not arise from the competition of railroads with one another; at least not to any great extent. They arise from the competition of water routes. The long line of sea coast and the great number of navigable rivers and canals make this a more important element in England than anywhere else. The committee of 1872 say that there is sea competition at about three-fifths of the stations in the United Kingdom. And thus it happens that while there is every year less and less competition between railroads, there is every year more and more complaint of discrimination.

The railroads have tried hard enough to control the water routes. They have gotten possession of competing canals, sometimes by methods whose legality was doubtful. In the case of natural waters they have tried to get control of the shipping or of the harbor facilities; and it is said that one railway, the Northeastern, running to all points on the Yorkshire coast and on the Tyne, has so far succeeded as to control competition by routes on the open sea. The water is free, but the railroad controls the landing places.

But there is one large and constantly increasing set of water routes which the railroad cannot control—the routes of trade between London and foreign countries. The western and northern railroads want their share of the traffic between America and London; the southern and eastern roads want their share of the traffic between Continental Europe and London. The railroads enter this contract under some decided disadvantages. It is the case of a combined water and rail route competing with an all-water route which is not essentially longer in distance. The distance from New York to London via Glasgow or Liverpool is about the same as *via* the Thames. The distance from Boulogne to London by Folkestone is not much shorter than from Boulogne to London by direct steamer. And the rail route involves one extra handling of the goods. The direct water rates are already so low that the railroad's share of a combined rate must be very small indeed; much smaller than that they charge on their inland business for the same service.

Thus, the rate from Glasgow to London on the beef of American cattle slaughtered at the wharf is 45s. per ton, while for Scotch meat the rate for the same service is 77s. Foreign hops are charged 17s. 6d. per ton from Boulogne to London; English hops are charged 35s. per ton from intermediate points. Norway lumber is conveyed at about half the rates charged for English lumber of the same quality. There are hundreds of such examples which might be given. Of course English producers feel very indignant at such discriminations; and they feel worse because it all seems to be

for the benefit of foreigners. The same sort of feeling was shown here before the Hepburn Committee by the New York men, who complained that the railroads carried cheaper for citizens of other states; but in England, where it is a case involving other nations, matters seem far worse. These competitive through rates appear to the English public like a premium on imports against home production.

Special rates to develop business have grown up in the same way as in America; it is hardly necessary to cite instances. It will be seen that there is little complaint nowadays of personal favoritism. It is certain localities, or certain lines of business, which the railroads favor, as against other localities or trades.

The attempt at state control of differential rates began about the time when railroad consolidation became important. By act of 1845 the companies were allowed to vary their charges at will within the maxima, but must charge all persons the same rate for the same service. This position was reaffirmed in the act of 1854, by which the railroads were forbidden to grant undue and unreasonable preferences. But this act left it to the Court of Common Pleas to determine what constitutes an undue preference. This jurisdiction was transferred to the Railway Commissioners in 1873. Taking the whole series of decisions, there is very little consistent principle to be discovered, even by the praiseworthy efforts of Gustav Cohn, to whose *Englische Eisenbahnpolitik* the writer of these articles is greatly indebted.

The Court of Common Pleas took up the matter most unwillingly. In every possible case it tried to shift the responsibility upon other courts. One of the great difficulties about obtaining redress under the act of 1854 was that the complainant would be sent from one court to another, and each would be unwilling to do anything. In the years 1854-73 there were only 29 cases under the act, and many of these were not under the section dealing with discriminating rates.

From the outset the court enforced the point that there should be no personal preferences; that under exactly similar circumstances all shippers should be treated alike. The railroads could make as many special rates as they pleased, but they must be given to everybody under the same conditions. They took this position so decidedly that they stopped the practice of personal favoritism almost entirely. Previous to 1854 there had been many complaints of this kind; afterward we find very few. Rebates, such as there were, were given secretly; when they were discovered the companies made private settlement for back differences with the parties aggrieved. The fact that a rate was kept secret was considered *prima facie* evidence of personal preference.

But the court often refused to go further than this in demanding equality of treatment. They were ready to allow other differences great weight. Allowance for quantity might be carried to almost any extent. If there was a slight difference in business conditions it was frequently assumed that the railroads might be left to judge for themselves. Even the decision in the case of *Baxendale vs. Great Western*, which is very guarded in its language, explicitly allows differential rates on a wide range of grounds. In one case of passenger fares very severe discrimination was allowed. The fare from A to B was 2s. 6d.; from B to C 9s. 6d.; from A via B to C only 2s. It was held that the people at B had no right to complain of inequality of treatment.

But there were other decisions of a wholly different tenor. There was a case in 1857 where a complaint was made of differential rates in the coal trade. The answer made by the Eastern Counties Railway was that the special rate was given to one mine to enable it to compete with others that had the advantage of a water route. This was held not to justify the differential rate. This view was several times reaffirmed; and it seems to have been held that such reasons do not justify inequality of treatment on different branches of the same line. Among the important cases of this kind the most recent, and perhaps the most explicit, is that of a manufacturer of tin plates, who complained that the rates from Swansea to Liverpool were lower than from the intermediate point where his factory was situated. The facts were admitted; the companies justified it by the necessity of meeting water competition. But it was held to constitute an undue preference.

On these points where the decisions conflicted the jurisdiction of the court broke down. It was not worth while to go to the expense and trouble of litigation unless you were sure of your case. When the Railway Commissioners came in they were more consistent. In fact, they let their consistency carry them on to dangerous ground. To all intents and purposes they hold the position taken by the legislators of the northwestern states as to what constitutes *prima facie* evidence of unjust discrimination.

The brewers of Newark complained that the brewers of Burton, on another branch of the same railroad, were given more favorable rates. The company replied that the Burton traffic could be handled to better advantage. The Commissioners allowed the difference of rates on part of the traffic, but prohibited it on particular consignments where they thought the cost of handling was as great for Burton as for Newark.

Several brewers in Burton were so situated as to have specially cheap access to the Midland station. To be able to compete for their traffic the London & North Western made a corresponding reduction in their terminal charges to these brewers. This was held to be an unjust discrimination against other breweries in the same town.

The Caledonian Railway was forbidden to charge a higher rate for Cannel coal than for less valuable kinds.

But the case which has aroused the most discussion is that of Denaby Main Colliery against the Manchester, Sheffield & Lincolnshire Railway. This colliery was a few miles nearer the market than other mines in the same district. The railroads put them all on an equality, the difference in distance being small. Denaby Main complained that it was robbed of its natural advantage of location. The Commissioners sustained the complaint in a decision which comes dangerously near the principle of equal mileage rates. The case has been twice appealed, but without success.

Taking these four decisions it may be said that the Commissioners have adopted the principle of basing rates upon cost of service. Their lack of power has prevented them from doing the harm that any general application of this principle would produce. But they have caused things to be looked at in a wrong light. The railroads, finding it of no avail to plead value of service or necessities of competition as the reason for inequality, attempt to prove a difference in the cost of service, where it does not really exist. And so we have the spectacle of shippers, courts, and railroads attempting to stretch a wrong principle to cover cases to which it does not apply.

But there were a great many cases where the standard was not elastic enough to fit the facts, and the facts too stubborn to be squeezed down to the standard; and this led to the appointment of the Parliamentary committee of 1881-82 to consider the subject of discriminating rates. The twenty-seven members of the committee represented a great variety of conflicting interests; four of them were railroad men. After hearing a vast mass of testimony this committee came to a different conclusion from the commission, and a more sensible one. When the committee came to make up their report two drafts were presented, one decidedly favorable to the railroads, the other criticising them moderately. The first was rejected by a vote of 12 to 10; but the second was so amended as to bring in many of the ideas of the first; and the final report as it stands defends differential rates, and does not regard cost of service as the sole standard. The report is negatively rather than positively good; but as compared with recent English decisions it is a great advance. No action was taken by Parliament upon it; in fact, as far as concerns our present subject, it called for no action. It simply declared that there were no general grounds for interference.

The present state of things may be summed up as follows:

1. The roads may make what special rates they please; but if they make a rate for one man they must extend the same privilege to all others in like circumstances. If they have been secretly paying rebates to one shipper they may be compelled to refund to any other shipper similarly placed the same rebates on all his shipments since the special contract with the one shipper began.

2. It is held by the Railway Commissioner that two shippers are similarly placed and must be similarly treated when the cost to the railroad of handling the goods for one is the same as for the other; and conversely, unless some special reason can be shown the railroad has no right to put a less favorably situated shipper upon an equality with a more favorably situated one.

3. But the last Parliamentary committee has refused to indorse these principles, and has said that "a preference is not unjust so long as it is the natural result of fair competition."

ARTHUR T. HADLEY.

NEW PUBLICATIONS.

General Specifications for Iron Railroad Bridges and Viaducts. Copyright by Theodore Cooper, Consulting Engineer, New York.

This publication, as the name implies, is a very full and complete set of stipulations for the construction of double-track railroad bridges of any span. It can be adapted to the case of any particular bridge by merely inserting the particulars of the site, the span, height above the water, etc. These factors have, of course, only a local importance, and if these general specifications are followed for all spans the owners or users of the bridges can feel certain that the same standard of excellence exists in all, and that each bridge, whatever its span, is equally well adapted for its purpose, and that as far as the exigencies of bridge-building permit each part of the structure is equally and proportionately strained, and that no weak points exist.

The specifications are of three kinds, "A," "B," and "C," differing only in being drawn up for different dead loads. Thus "A" is calculated for a train weighing 3,000 lbs. per lineal foot, and drawn by two consolidation engines, each having 24,000 lbs. upon each driving axle. In specification "B," these loads are taken at 2,240 lbs., and 22,000 lbs. respectively. In "C" the train is taken as weighing but 2,000 lbs. per foot forward, and is drawn by two Mogul engines with 25,000 lbs. upon each pair of drivers. It is obvious that for long spans the severest load is a large total weight, even if it be distributed upon many wheels individually lightly loaded, while on a very short span, such as a cross girder, a single engine with a great weight upon one or two axles will be more severe than a long train of cars. Mr. Cooper has therefore given in each case an example of an imaginary engine which will locally strain the bridge as much as any known engine running. On certain spans a consolidation engine is the most trying, and on others a heavy type American engine. The example given on specification "A," 80,000 lbs., equally distributed on two pairs of drivers, seven feet centres, meets the case, and if provision is made to carry such an engine without undue local strains, the bridge will safely carry any engine running.

The specifications first lay down conditions as to the class of girders to be employed for the different spans, for instance, up to 16 feet rolled beams are to be used; from 16 to

60 feet riveted plate girders, and so on. The distance apart of the tracks and amount of clear space to be left free for the passage of trains are laid down.

The specification then enumerates the maximum loads to be provided against, the dead load of the track, wind pressure, the application of continuous brakes to a passing train, etc. An enumeration follows of the maximum strains permissible on the different portions of the bridge structure, such as lateral bracing, bottom chords, counter rods, floor beam hangers, etc., distinguishing between the safe loads when these parts are forged eye-bars or made of plates or shapes. The permissible strains are definitely given in pounds per square inch, instead of any vague allowances of percentages above or below some standard amount of strain.

The condition as to the load and the strains upon the different portions of the bridge structure are very clearly and explicitly set forth, and are followed by numerous minute stipulations as to the details of construction, quality of material, workmanship, painting, testing, etc.

It would certainly appear that these specifications, which are exceedingly complete and free from ambiguity, will serve a very useful purpose in setting forth a definite standard of excellence, and if adopted generally would save much time and labor now consumed in drawing up separate specifications for each job as it is wanted. Unless the specification is very fully and carefully drawn up it is apt to be misunderstood or evaded, and even when this is not the case the adoption of certain strains as a standard would save much time now spent in calculations based on varying data. The use of a uniform set of rules as to proportion of details, etc., would also effect a saving of both time and labor in the preparation of patterns and templates.

The adoption of a standard is often a barrier to the introduction of future improvements, but it is difficult to see how this can be the case in the standard specifications proposed by Mr. Cooper. The specification relates to the amount of load to be provided for and the quality and fitness of the parts for their purpose. The general method of carrying out that purpose is left unfettered, and the specifications would not prohibit or interfere with the introduction of a novel form of bridge, provided only that it was so designed that the strains could be calculated with a reasonable amount of precision and that the bridge could be made to bear the loads enumerated in the specifications. In other words, the standard specifications insist only on the bridge being safe and, subject to this, leave the designer free to avail himself of any existing or future improvements in bridge building.

Illustrated Catalogue of Wrought Iron Blocks, etc., manufactured by the Fenfield Block Company, Lockport, N. Y.

This catalogue illustrates many varieties of the anchor brank of pulley blocks, as well as baggage barrows, car pushers, etc. A novel and useful feature is the introduction of a complete cipher telegraph, or code, in which only one or two words need be used in ordering any article by wire, instead of giving a lengthy description; for instance, the message, "Ship us soon by rail, usual or best route, 15 triple 7 in. inside iron-strapped blocks, with common lignum vitae sheaves, and common hooks and becketts," can be expressed by "Bale fifteen adrift," thus saving 24 words, some trouble, a little money, and possibly an error.

TECHNICAL.

Coal and Iron in Alabama.

The certificate of incorporation of the Watts Coal & Iron Co. was recently registered in the office of the Clerk of the Probate Court of Jefferson County. The purpose of this corporation—which has a capital stock of \$150,000, with authority to increase the stock to \$1,000,000, divided into shares of \$100 each, and which will operate from Warrior station in this county—is to mine, transport, buy and sell coal and other minerals; to operate coal and iron mines; to make coke; to mine and sell iron ore; to build railroads, engines and machinery, and other business pertaining to those branches; to purchase or sell real estate; and to buy and sell goods. The stockholders have elected the following: President, Eugene Morehead; Vice-President, J. F. B. Jackson; Secretary, Treasurer and Superintendent, John N. Webb. The first shaft to be sunk by this company will be about 3½ miles south of Warrior, and some 300 yards from the line of the Louisville & Nashville Railroad, near Morris station.

The Warrior Coal & Coke Co.'s first mine will be opened about two miles northwest of Warrior. Books of subscription to the capital stock of the Birmingham & Tennessee River Railroad Co. will be opened at the office of the Probate Judge of Jefferson County, in this City, on March 23. Already a force of 112 negro laborers has been set to work on the first division of this road near the new town of Sheffield, on the Tennessee River, the force having been brought from Atlanta via Birmingham. It is employed on what is known as the Gordon contract. The location of this road will be second to none of all the roads running through the coal fields of this state. For two-thirds of its entire length it will traverse the heart of the famous Warrior coal-fields, and will be the means of opening up a great many new mining properties. For cheap mining, this road will have great advantages, such as the drifting system and natural drainage, possessed by few roads in this state, as almost every seam in the Warrior field is exposed along its entire route. The course of this road will be northwest and southeast. Jeremiah Baxter, W. McCracken and John H. Sample are the board of incorporators. Messrs. W. B. Flood, of Florence, Ala.; Jeremiah Baxter, of Nashville; W. V. McCracken, of Columbus, O.; John H. Sample, of Granville, O., and H. L. Terrell, of New York, have filed articles of incorporation with the Probate Judge of Colbert County, preparatory to organizing the Alabama Improvement Co. They propose to issue stock, and do a general mining, immigration, and industrial business.

Twenty-five coke-ovens are completed and in full operation at the mines of the Broken Arrow Coal & Mining Co., St. Clair County, Ala. It is learned from Messrs. Noble & Co., of Anniston, Ala., that the coke is of very good quality. There are efforts now making for the opening of more coal mines along the line of the East & West Alabama road in the Coosa field.

In the Coosa field but little has been done. The only

company operating there, which recently began running, is the Broken Arrow Coal & Mining Co. Its product is about 1,500 tons for January. In all, the total is about 119,000 tons for the state. This, I think, will be a fair estimate, as the reports which I usually look for come in very irregularly, and I can only base my estimate on what I see. February's output will probably exceed these figures by about 10 per cent.—*Correspondence of Engineering and Mining Journal.*

Large Outputs of Steel Rails.

On both sides of the Atlantic very remarkable results have recently been accomplished in the production of large quantities of steel rails by individual works.

During the week ending Feb. 9 Bolckow, Vaughan & Co.'s Easton No. 1 rail mill turned out 4,310 gross tons of steel rails. Their No. 2 blooming mill rolled all the blooms for these rails and 288 tons more. Rails were changed five times in the rail mill. The largest production of one turn (12 hours) was 559 tons of blooms and 470 tons of rails. Work began on Monday at 6 a. m., and ended on Saturday at 4 p. m. More than half of the steel was made from Cleveland ore.

During the week ending at 4 p. m., on Saturday, March 1, the Edgar Thomson Steel Works produced 4,653 gross tons of ingots, and rolled 4,110 gross tons of rails. Their largest 24 hours' work was 709 tons of rails. In one 8-hour turn 256 tons were rolled.

When Mr. Windsor Richards, the Manager of the former works was in America, and saw the large turnout of American rail mills, he said he would endeavor to beat the record when he returned to England. He has apparently succeeded by 200 tons in a week's work. The results are very creditable to both works, each having rolled more rails than were ever before rolled in a week.

Probably most of the English rails were of the bulk-head pattern, now generally preferred there, being a double head, not intended to be reversed, and having the wearing head considerably larger than the lower head, which serves simply as a lower chord to the girder formed by the whole rail. Rails of this form weighing, as they do, 84 to 92 lbs. per yard, are more easily rolled than lighter flange rails, and therefore in two mills of equal capacity and equally well managed, we should expect the mill making bulk-heads to turn out the greater tonnage, and the flange rail with the greater number or length of rails.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:

Allegheny Valley, annual meeting, at the office in Pittsburgh, Pa., April 8.

New York Central & Hudson River, annual meeting, at the office in Albany, N. Y., April 16.

Chicago, St. Louis & Pittsburgh, annual meeting, in Indianapolis, Ind., March 19.

Pennsylvania, annual election, at the office, No. 233 South Fourth street, Philadelphia, March 25. The polls will remain open from 10 a. m. to 6 p. m. on that day.

Pittsburgh, Cincinnati & St. Louis, annual meeting, at the office in Columbus, O., March 18.

Dividends.

Dividends have been declared as follows:

Lehigh Valley, 2 per cent., quarterly, payable April 15, to stockholders of record March 17.

New York Central & Hudson River, 2 per cent., quarterly, payable April 15. Transfer books close March 15.

New York & Harlem, 2 per cent. from the profits of the city line, payable April 1. This dividend is in addition to the 8 per cent. paid by the New York Central & Hudson River Co. under the lease.

Union Pacific, 1½ per cent., quarterly, payable April 1. Transfer books close March 10.

Western Union Telegraph, 1½ per cent., quarterly, payable April 15. Transfer books close March 20.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

Western Association of General Passenger & Ticket Agents, at the Burnett House in Cincinnati, O., on Monday, March 17.

National Association of General Passenger & Ticket Agents, regular annual meeting, at the Burnett House in Cincinnati, O., at 11 a. m., Tuesday, March 18.

Master Car-Builders' Club, regular monthly meeting, at the rooms, No. 113 Liberty street, New York, on Thursday evening, March 20, at 8 o'clock. Subject for discussion: Car Wheels and Axles, including the Seating of Wheels to Gauge on Axles. The meeting of Jan. 17 was adjourned to March 20.

General Time Convention, Spring meeting, at the Grand Hotel in Cincinnati, O., at 11 a. m., on Wednesday, April 9.

Southern Time Convention, Spring meeting, at No. 46 Bond street, New York, at 11 a. m., on Wednesday, April 10.

Railway Car Accountants' Association, annual convention, in Richmond, Va., on Tuesday, May 20.

Master Car-Builders' Association, annual convention, in Saratoga, N. Y., beginning on Tuesday, June 10.

Master Mechanics' Association, annual convention, in Long Branch, N. J., beginning on Tuesday, June 17.

General Baggage Agents' Association, semi-annual meeting, in Boston, Wednesday, July 16.

Trunk Line Presidents' Meeting.

A meeting of the presidents of the Trunk Lines was to be held March 13 at Commissioner Fink's office in New York. It is expected to continue two days. The objects of the meeting are not stated, but the present condition of freight business will undoubtedly be considered and some effort made to prevent the cutting of rates.

Engineers' Society of Western Pennsylvania.

The Engineers' Society at Western Pennsylvania held their annual dinner at the Monongahela House in Pittsburgh, Feb. 28. A large number of members and several invited guests were present. Mr. William Miller, President of the Society occupied the chair and the dinner passed off very pleasantly. A number of speeches were made in the course of the evening in answer to toasts.

Northwestern Traffic Association.

A meeting of the Northwestern Traffic Association was held in Chicago, March 7, representatives being present from the Chicago, Milwaukee & St. Paul, the Chicago & Northwestern, the Chicago, Rock Island & Pacific and the Minneapolis & St. Louis. The Commissioner stated that the object of the meeting was to consider the report of the committee appointed the previous week. The committee had been unable to come to any conclusion, and by resolution referred matters pertaining to cut and west-bound business to the managers for their consideration. The report of the committee was accepted and the committee discharged. Mr. Cable, of the Rock Island road, offered resolutions referring the division of traffic to three arbitrators,

to consist of Mr. George M. Bogue and two others, to be selected, the percentages fixed by such arbitration to continue for two years. After a long discussion this resolution was put to vote, but was not passed, the Northwestern and Omaha voting against it, a unanimous vote being necessary for its adoption. After some further discussion the meeting adjourned, subject to the call of the Commissioner.

Engineers' Club of Philadelphia.

The regular monthly meeting was held at the rooms in Philadelphia on the evening of March 1, President Wm. Ludlow in the chair; 34 members and 8 visitors present.

President Ludlow described tests of the crushing strength of ice which were made by him in order to learn, approximately, the strength required for an ice harbor of iron screw-piles, in mid-channel, at the head of Delaware Bay. Eighteen pieces were tried with government testing machines at Frankford, Philadelphia, and at Fort Tompkins, Staten Island. The specimens were carefully prepared 6-in. and 12-in. cubes, and roughly cut slabs about 3 in. thick, of different qualities and from different localities. From pure Kennebec ice the lowest strength obtained was 327 pounds and the highest 1,000 pounds per square inch. For inferior qualities the strength varied from 225 to 917 pounds. The higher results were obtained, generally, when the air temperature in the testing room was from 29° to 36° F.; as against 55° to 68° F. for the lower results. The pieces generally compressed ¼ to 1 in. before crushing.

The Secretary exhibited for Mr. C. A. Ashburner a set of blues of some yet unpublished details of the Chicago cable railways.

The Secretary presented a note by Prof. W. S. Chaplin upon a prevalent error in data given for determining the true meridian.

Mr. C. J. Quetif, visitor, exhibited models of the wire truss recently described by him.

Prof. Mansfield Merriman presented a statement of the progress of the triangulation carried on in Pennsylvania by the United States Coast and Geodetic Survey and exhibited a map showing its present condition. The stations located are 27 in number, of which 19 have been occupied for the measurement of angles. These are in the southeastern part of the state, in the counties of Bucks, Montgomery, Delaware, Chester, Lancaster, York, Dauphin, Lebanon, Berks, Lehigh, Northampton, Monroe, Carbon and Schuylkill. The geographical positions of the stations have been computed from two of the sides of the primary coast triangulation, one near Elkton, Md., and the other near Trenton, N. J., which serve as bases for the work thus far executed.

The Secretary announced the receipt of the following contributions to the library from two very good friends of the Club: From Gen. Wm. F. Reynolds several hundred valuable reports, documents and maps, and from Mr. Thos. L. Luder a handsome framed photograph of the new public buildings at Brussels.

Baltimore & Ohio Employes' Relief Association. The following circular from the Secretary's office is dated Feb. 29, 1884:

"Notice is hereby given those concerned that the management of the Association is now prepared to make its usual distribution of remedies for preventing and checking chills and fever and other malarial disorders, cholera morbus, acute and chronic diarrhoea and dysentery, and that they can be had upon application to this office. The medicines issued by the Association are for the use of members only; but as each bottle is labeled with the formula of its contents, and full directions for use, they can be duplicated at any drug store, where needed by other persons than members.

"Agents, master mechanics, supervisors and others in charge of the company's employes are requested to send in their requisitions as promptly as possible for such quantities as will be absolutely needed for a two months' supply, and always to keep some on hand. Conductors are requested to call for fresh supplies when the medicines placed in their cabooses and baggage cars are exhausted, and foremen are requested to keep their shops and hand-cars supplied. Arrangements are about being perfected for placing supplies of medicines and suitable surgical appliances in every baggage car and caboose in active service.

"Printed instructions how to use medicines and what to do in emergencies will shortly be placed upon every engine, baggage car and caboose, and in every round-house, machine-shop, master mechanic's, supervisor's and dispatcher's office, and every officer employing labor will also be furnished a copy.

"Medicines are issued by the Association with a view to lessening sickness in the service, and consequent demands upon the relief fund for the maintenance of members when disabled. Experience and observation show that, during those months when men are engaged in bodily labor under exposure to summer heat and sudden changes of temperature, attacks of diarrhoea and kindred disorders are generally induced by indiscretions, particularly in drinking ice water, which is dangerous where men are overheated or suffering from malarial poisoning. In the interest of the health of our fellow employes and the Association, the assistance of every officer is solicited in restraining his men from excessive drinking of ice-water, and, when attacked with the disorders named above, in persuading them to take promptly the remedies provided for such disorders, and which long experience has proven efficacious when properly used."

Appended to the circular are prescriptions to be used in cases of chills and malarial disorders, and for diarrhoea and dysentery, with directions for the use of the remedies.

The January sheet of the Association shows the payment of benefits to 637 persons, as follows: Main Stem, Transportation Department, 90; Machinery Department, 165; Road Department, 62; Trans-Ohio Divisions, 146; Pittsburgh Division, 59; physicians' bills, 115; a total of 637 payments.

ELECTIONS AND APPOINTMENTS.

American Society of Civil Engineers.—At the regular monthly meeting on March 5 the following elections were completed:

Junior, Thomas D. Whistler, South Orange, N. J. Transferred from Junior to Member, Edmund Hayes, Buffalo, N. Y.; Albert B. Hill, New Haven, Conn.

Elected members, Frederick J. Carrel, Cascade Locks, Oregon; Samuel J. Fields, Buffalo, N. Y.; Asa B. Fitch, Terre Haute, Ind.; Wm. E. Hoyt, Rochester, N. Y.; Henry F. McDonald, Louisville, Ky.; John H. Staats, Jersey City, N. J.; Christopher C. Walcott, U. S. Navy Yard, Mare Island, Cal.; Frederick S. Osell, New York.

Atchison, Topeka & Santa Fe.—Mr. George B. Lake is appointed Engineer of this road, with headquarters at Topeka, Kansas.

Atlanta & Charlotte Air Line.—At the annual meeting in New York, March 12, directors were elected as follows: William H. Fogg, Richard Irwin, Jr., R. A. Lancaster, H. W. Sibley, B. R. McAlpine, Skipwith Wilmer, E. R. Lancaster, Jr., F. T. Redwood, W. J. Nevins, Jr., C. C. Lancaster, E. Scofield, Hiram Sibley. Messrs. E. R. and C. C. Lancaster, Nevins and Scofield succeed Eugene Kelly, James E. Grannis, Robert Stobo, and P. P. Dickinson.

Baltimore & Ohio Employes Relief Association.—The following have been elected members of the Committee of Management for the year beginning July 2 next: A. J. Cromwell, Arthur Sinsel, Main Line; Thomas Fitzgerald, David Lee, Trans-Ohio divisions; J. E. Samsel, Pittsburgh Division.

Bogue.—Mr. H. B. Short, of Bogue, N. C., is President of this company.

Charleston & Savannah.—At the annual meeting in Charleston last week the old directors were re-elected, as follows: W. H. Brawley, C. Y. Memminger, Charleston, S. C.; B. F. Newcomer, W. T. Walters, Baltimore; W. H. Cutting, H. B. Plant, New York.

Chicago & Alton.—Mr. Howard E. Laing has been appointed Special Agent of the Passenger Department. He has been for some time connected with the Wabash road.

Chicago & Grand Trunk.—At the annual meeting, March 12, the old board was re-elected and afterward chose Joseph Hickson President; L. J. Seargeant, Vice-President; Charles Purser, Secretary and Treasurer.

Chicago, Milwaukee & St. Paul.—Mr. Roswell P. Miller, for some time past Assistant to the General Manager, has been appointed Assistant General Manager. He will act as General Manager during Mr. Merrill's absence in California.

Cold Spring & Hamburg.—Mr. A. F. Page, of Blue's Crossing, N. C., is President of this company.

Connotton Valley.—The following appointments are announced by the Receiver, taking effect March 1: Mr. Henry B. Dunham, General Freight and Passenger Agent, office at Canton, O. Mr. Albert Rokusek, Assistant General Freight and Passenger Agent, office at Cleveland, Ohio.

Elmira, Cortland & Northern.—The directors of this company (successor to the Utica, Ithaca & Elmira) are: James D. Campbell, Davenport, Ia.; Archibald A. McLeod, Elmira, N. Y.; James K. O. Sherwood, Oyster Bay, N. Y.; Henry W. Maxwell, J. Rogers Maxwell, Brooklyn, N. Y.; James Armstrong, Charles Bruff, Austin Corbin, Frederick W. Dunton, John P. Dosh, Gilman S. Moulton, Thomas F. Ward, Wm. G. Wheeler, New York.

Fall River, Warren & Providence.—At the annual meeting in Providence, R. I., March 10, the following directors were chosen: Charles F. Choate, Cambridge, Mass.; Frederick L. Ames, Easton, Mass.; Royal W. Turner, Randolph, Mass.; Thomas J. Borden, John S. Brayton, Fall River, Mass.; Thomas Dunn, Newport, R. I. The road is controlled by the Old Colony.

Gainesville, Jefferson & Southern.—Mr. J. W. Green (General Manager of the Georgia Railroad) having been appointed General Manager of this road, issues the following, dated Augusta, Ga., March 10:

"The undersigned this day assumes the charge of the Gainesville, Jefferson & Southern Railroad.

"The following appointments are announced: E. R. Dorsey, General Freight and Passenger Agent; Carlton Hillyer, Auditor; W. T. Richards, Treasurer."

These gentlemen are all officers of the Georgia Railroad.

Grand Rapids & Indiana.—At the annual meeting in Grand Rapids, Mich., March 5, the following directors were chosen: H. H. Hollister, W. O. Hugbart, W. R. Shelby, Grand Rapids, Mich.; S. S. Cobb, Frank B. Stockbridge, Kalamazoo, Mich.; J. G. Waite, Sturgis, Mich.; C. A. Zollinger, Fort Wayne, Ind.; J. N. McCullough, Thomas D. Messier, Pittsburgh, Pa. The board elected W. O. Hugbart President and General Manager; W. R. Shelby, Vice-President, Treasurer and Purchasing Agent; J. H. P. Hugbart, Secretary; F. A. Gorbam, Auditor; J. M. Meathany, Superintendent Northern Division; P. S. O'Rourke, Superintendent Southern Division; C. E. Gill, General Freight Agent; C. L. Lockwood, General Passenger Agent; T. J. O'Brien, General Counsel.

Mr. Chas. B. Leet having resigned his position as Traveling Freight Agent of this company, Mr. Thomas L. Pierce is appointed Traveling Freight Agent, with headquarters at Grand Rapids, Mich., to take effect March 6.

Illinois Central.—At the annual meeting in Chicago, March 12, the following directors, one-fourth of the board, were chosen: W. Luttgren, Sidney Webster, Robert Golet and S. Van Rensselaer Cruger, all of New York. Mr. Webster is the only one re-elected, Messrs. Frederick Sturges and L. V. F. Randolph retiring, and Mr. Luttgren replacing W. K. Ackerman, resigned.

Illinois, Southern & Paducah.—The officers of this new company are: President, C. C. Simmons, St. Louis; Vice-President, C. C. Chase, Waterloo, Ill.; Secretary and Chief Engineer, C. A. M. Schlicherholz, Waterloo, Ill.; Treasurer, Augustus S. Tayon, St. Louis; Superintendent, R. L. Miller, St. Louis.

Kentucky Central.—The following circular has been issued by General Manager C. W. Smith, under date of March 1:

"By reason of other appointments heretofore announced Mr. C. L. Brown, formerly General Passenger and Freight Agent, will, on and after this date, act in the capacity of Division Freight Agent, with headquarters at Covington. All matters pertaining to the freight department should be referred to Mr. Brown as heretofore."

At the annual meeting last week the following directors were chosen: Hariton Alexander, George Bliss, John Echols, James B. Hawes, C. P. Huntington, M. E. Ingalls, Elliott H. Pendleton.

Little Rock & Choctaw.—This company has been fully organized with the following officers: President, W. D. Slack; Vice-President, J. N. Smithee; Secretary and Treasurer, S. H. Nowlin; Chief Engineer, James E. Johnson; Auditor, Thos. W. Newton; Land Commissioner, W. B. Turman; Attorney, R. C. Newton. Office in Little Rock, Ark.

Meherrin Valley.—The officers of this company are: President, A. W. Jones, Richmond, Va.; Superintendent, M. T. Dill, Portsmouth, Virginia.

Missouri Pacific.—At the annual meeting in St. Louis, March 11, the following directors were chosen: L. H. H. Clark, Omaha, Neb.; R. S. Hayes, Joseph S. Lowrey, St. Louis; F. L. Ames, Boston; Sidney Dillon, Thomas T. Eckert, G. J. Forrest, Jay Gould, George J. Gould, A. L. Hopkins, H. G. Marquand, Russell Sage, Samuel Sloan, New York.

New York & New England.—Mr. E. G. Allen has been appointed General Agent, with charge of the docks, elevators and terminal stations in Boston. He was formerly Superintendent of the Massachusetts Central, and was recently appointed Superintendent of the Ohio River road.

New York, Susquehanna & Western.—Mr. George Smith has been appointed Road-Master, to date from March 15. He has been on the Erie for some time.

Peoria, Decatur & Evansville.—At the annual meeting last week the following directors were chosen: George S. Bradbury, J. B. Cobbs, C. R. Cummings, Frank C. Hollins, E. H. R. Lyman, J. T. Martin, Nelson Robinson, George I.

Seney, Charles Vile. The only new director is Mr. Hollins, who replaces Charles Denby.

Philadelphia, Marlton & Medford.—At the annual meeting in Camden, N. J., March 6, the following directors were chosen: Job Braddock, Benjamin Cooper, Wm. L. Elkins, Ellwood Evans, Joseph Evans, David D. Griscom, Wm. C. Houston, Crawford Miller, Edmund D. Reed, Charles J. Watson, Henry W. Wills, Elijah B. Woolston, Daniel M. Zimmerman. The road is leased to the Camden & Atlantic.

St. Louis Bridge.—At the annual meeting in St. Louis, March 4, the following directors were chosen: Gerard B. Allen, J. P. Morgan, Wm. Taussig, E. Walsh, Jr., J. S. Walsh.

St. Louis, Fort Scott & Wichita.—At the annual meeting in Fort Scott, Kan., March 4, the following directors were elected: W. Chenault, F. Tiernan, J. W. Miller, J. H. Richards, A. W. Walburn, G. C. Smith, E. Merriam, D. P. Moran. The board subsequently met and elected officers as follows: President, G. C. Smith; Vice-President and General Manager, J. W. Miller; Secretary, J. H. Dowland; Treasurer, W. Chenault.

Mr. Smith succeeds Mr. Tiernan as President, and Mr. Miller, heretofore General Superintendent, becomes General Manager, a new office on this road. Mr. Tiernan retires from the active management, although he remains a director of the company.

St. Louis, Iron Mountain & Southern.—At the annual meeting in St. Louis, March 11, the following directors were chosen: R. S. Hayes, R. C. Kears, R. J. Lockland, Joseph S. Lowrey, St. Louis; Sidney Dillon, Thomas T. Eckert, Jay Gould, A. L. Hopkins, H. G. Marquand, Russell Sage, Samuel Shethar, John T. Terry, New York; Henry Whelen, Philadelphia. The road is owned by the Missouri Pacific.

St. Louis & San Francisco.—At the annual meeting in St. Louis, March 11, the following directors were chosen: Leland Stanford, San Francisco; C. P. Huntington, Jay Gould, Russell Sage, Jesse Seligman, E. F. Winslow, James D. Fish, William F. Buckley, Horace Porter, A. S. Hatch, New York; W. L. Frost, Boston; Charles W. Rogers, R. S. Hayes, St. Louis.

St. Louis Union Depot Co.—At the annual meeting in St. Louis, March 4, the following directors were chosen: A. H. Calef, Jay Gould, A. L. Hopkins, James F. How, D. S. H. Smith, Wm. Taussig, C. G. Warner.

Savannah, Florida & Western.—At the annual meeting in Savannah last week the following directors were chosen: W. S. Chisholm, H. S. Haines, J. H. Estill, Savannah, Ga.; Morris K. Jesup, M. J. O'Brien, Henry B. Plant, Henry Sanford, New York. The board re-elected Henry B. Plant, President; H. S. Haines, General Manager; R. B. Smith, Secretary; W. P. Hardee, Treasurer.

The following officers were chosen for the leased Waycross & Florida: H. S. Haines, President; W. P. Hardee, Secretary and Treasurer.

Scioto Valley.—Mileage of all this company's cars should be reported to James A. Fanning, Auditor, Columbus, O. All reports or inquiries relating to the movement of cars should be addressed to W. K. Field, Car Accountant, Columbus, O.

Texas & St. Louis.—The Receiver has appointed Mr. A. C. Sheldon General Freight and Passenger Agent in place of Mr. George W. Lilley, who has gone to the Missouri Pacific road. Mr. Sheldon has been connected with the Chicago, Burlington & Quincy for a number of years.

Wabash, St. Louis & Pacific.—At the annual meeting in St. Louis, March 11, the following directors were chosen: Adolph Engler, R. S. Hayes, Thomas E. Tutt, St. Louis; George L. Dunlap, Chicago; Charles Ridgley, Springfield, Ill.; James F. Joy, Detroit, Mich.; James Cheney, Fort Wayne, Ind.; F. L. Ames, Boston; Sidney Dillon, Jay Gould, G. G. Haven, A. L. Hopkins, Solon Humphreys, Russell Sage, Samuel Sloan, New York.

Wabash, St. Louis & Pacific Leased Lines.—At meetings held last week officers were elected as below for the companies named, whose roads are leased to the Wabash, St. Louis & Pacific Co.: **Brunswick & Chillicothe.**—President, R. S. Hayes; Vice-President, G. M. Rice; Secretary, E. P. Burnham; Assistant Secretary, James F. How; Treasurer, D. G. H. Smith. **Quincy, Missouri & Pacific.**—Directors, W. H. Blodgett, C. H. Ball, A. Green, James F. How, Solon Humphreys, C. W. Keyes, W. B. Lockworthy, Charles Ridgley, A. Root. **St. Louis, Jerseyville & Springfield.**—Robert Andrew, Wm. H. Falkerson, R. S. Hayes, James F. How, Morris R. Locke.

PERSONAL.

—Mr. E. B. Sheffer, for the past two years Chief Clerk to the General Superintendent of the New York & New England Railroad, has resigned to accept a position with Mr. S. M. Felton, Jr., on the New York, Lake Erie & Western road. Mr. Sheffer leaves many friends in Boston.

—Mr. S. S. Merrill, General Manager of the Chicago, Milwaukee & St. Paul road is seriously ill. The nature of his sickness has not been made public, but common report is that he is suffering from a stroke of paralysis. It is said that he will soon start for California in hopes that the trip will benefit his health.

—Mr. Wendel Bollman, the well-known bridge-builder, died March 11, at his residence in Baltimore, aged 70 years. He was for many years connected with the Baltimore & Ohio road, but for some 25 years past he had carried on business on his own account as an engineer and bridge-builder. A more extended notice of his life will be found elsewhere.

—Mr. Beach Vanderpool, an old and well-known citizen of Newark, N. J., died in that city March 12, aged 77 years. He was for many years a prominent business man and had accumulated a large property. He held several public offices. He was one of the originators of the Morris & Essex Railroad, and was for a number of years a director and at one time President of the company.

—The Pottsville *Miners' Journal* of March 7 says: "Zephaniah Smith, one of the oldest employes of the Philadelphia & Reading Railroad Co., died at his residence in the 'Orchard' Wednesday afternoon. He entered the employ of the company as chain carrier, when the road was being surveyed between Reading and Pottsville, and has been in continuous service of the company until the present time. For a number of years he was employed as passenger locomotive engineer on the main line, and later ran an engine on the lateral roads. For 20 years past he has been employed in the shops at Palo Alto, working upon the repair and inspection of engines."

—Mr. James L. Shipman, who died in the village of Huntington, N. Y., on March 7, in the 75th year of his age, was one of the most respected citizens of that town. He was born in Saybrook, Conn. In 1836 he was made Resident Engineer of the Long Island Railroad, and soon after Chief Engineer

of the road, which at that time was being extended eastward from Jamaica. Upon the completion of the line he undertook the management of the construction of the New York & Harlem road and carried it successfully through to its completion. He also constructed several important Western railways. He was at one time a member of the firm of Shipman & Martin, which built a number of branches for the Long Island Railroad Co. during the Presidency of Mr. Morris and the late Oliver Charlick.

—Gen. James K. Moorhead, for many years a prominent citizen of Pittsburgh, died in that city March 6, aged 78 years. He was born in Dauphin County, Pa., and when 20 years old began life for himself by taking a contract on the Pennsylvania Canal. After completing his work was made Superintendent of the Juniata Division, and held that office several years. Later he established and ran a line of passenger and freight boats. In 1839 he settled in Pittsburgh and soon afterward took the contract for the improvement of the Monongahela River by the construction of slackwater dams. He was for many years President of the Monongahela Improvement Co., and was also President of the Atlantic & Ohio Telegraph Co. for several years. In 1858 he was elected to Congress from the Pittsburgh District and served for 10 years. For several years past he has been President of the Pittsburgh Chamber of Commerce.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

Two months ending Feb. 29:	1884.	1883.	Inc. or Dec.	P. c.
Bur. C. R. & No.	\$415,817	\$383,711	I.	\$32,106 8.3
Canadian Pacific	485,000	382,000	I.	103,000 26.9
Central Iowa	209,114	157,205	I.	51,909 33.0
Central Pacific	2,967,000	3,171,681	D.	204,681 6.5
Ches. & Ohio	557,570	505,416	I.	51,954 10.3
Chi. & St. Paul, M. & Omaha	671,600	594,273	I.	77,327 13.0
Chi. & W. Mich.	217,973	200,636	I.	17,337 8.6
Cin. N. O. & T. P.	343,905	327,711	I.	15,984 4.6
Cleve. Ak. & C.	61,404	71,496	D.	10,092 14.2
Det. Lan. & No.	182,025	199,706	D.	17,681 8.8
E. Ten. Va. & G.	625,786	616,232	I.	9,554 1.5
Eliz. Lex. & B. S.	86,175	103,391	D.	17,216 19.7
Flint & Pere Mar.	378,267	355,704	I.	22,563 6.3
Fla. Central & W.	78,952	75,150	I.	3,803 5.1
Fla. Transit & P.	98,410	81,230	I.	17,180 21.2
Fr. Worth & D.	50,700	49,000	I.	1,700 3.4
Georgia Pacific	63,610	.....	.....	.....
G. B. W. & St. P.	54,558	46,024	I.	8,534 18.8
Ind. Bloom. & W.	411,516	451,074	D.	49,558 11.0
Marq. H. & O.	30,111	36,880	I.	6,769 22.5
Memphis & Ch.	234,212	216,344	I.	17,868 8.3
Mil. & Northern	60,655	54,855	I.	5,800 10.6
Norfolk & West.	438,174	376,631	I.	56,543 15.0
Ohio Central	170,548	151,525	I.	19,023 10.3
Peoria, Dec. & E.	121,323	95,989	I.	25,334 26.5
Roch. & Pitts.	151,515	47,212	I.	104,303 221.9
St. P. & Duluth	129,225	134,549	D.	5,324 4.0
Tol. Cin. & St. L.	177,185	141,601	I.	35,584 25.0
Western N. C.	63,306	47,540	I.	15,766 24.8
Wis. Central	28,795	180,702	I.	48,033 32.6

Month of January:
Cleve. Col. Cin. \$275,441
Ohio & Miss. 329,401

1884.	1883.	Inc. or Dec.	P. c.
Bur. C. R. & No.	\$201,963	\$187,001	I. 14,962 8.0
Canadian Pacific	226,000	195,000	I. 31,000 15.9
Central Iowa	88,196	79,956	I. 8,240 9.3
Central Pacific	1,384,000	1,424,000	D. 40,000 2.8
Ches. & Ohio	275,975	253,446	I. 22,529 8.9
Chi. & St. Paul, M. & Omaha	328,503	285,800	I. 42,703 15.0
Chi. & W. Mich.	112,840	99,672	I. 13,168 13.2
Cin. N. O. & T. P.	161,434	141,980	I. 19,454 13.7
Cleve. Ak. & C.	29,842	34,462	D. 4,620 15.5
Det. Lan. & No.	91,554	92,273	D. 719 0.8
E. Ten. Va. & G.	315,907	313,253	I. 2,654 0.9
Eliz. L. & B. S.	40,350	55,498	D. 15,148 37.5
Flint & Pere Mar.	101,818	105,150	I. 3,332 3.3
Fla. Central & W.	38,613	35,555	I. 3,058 7.8
Fla. Transit & P.	46,615	38,911	I. 7,704 19.8
Fr. Worth & D.	30,200	24,000	I. 6,200 25.8
G. B. W. & St. P.	24,449	22,198	I. 2,251 9.3
Ind. Bloom. & W.	212,831	202,931	I. 9,900 4.0
Marq. H. & O.	19,474	17,076	I. 2,398 12.3
Memphis & Ch.	103,610	103,000	I. 610 0.6
Norfolk & West.	220,154	176,144	I. 44,010 24.7
Ohio Central	83,288	76,156	I. 7,132 9.4
Peoria, Dec. & E.	50,591	45,507	I. 5,084 10.0
Roch. & Pitts.	84,111	21,478	I. 62,633 292.1
St. P. & Duluth	56,457	60,085	D. 3,628 6.4
Tol. Cin. & St. L.	83,641	61,598	I. 22,043 35.6
Western N. C.	34,004	27,450	I. 6,554 25.2
Wis. Central	106,762	87,531	I. 19,230 21.8

Fourth week in February:
Chi. & Gd. Trunk. \$58,710

1884.	1883.	Inc. or Dec.	P. c.
Chi. Mil. & St. P.	\$346,000	\$401,824	D. \$55,824 13.9
Chi. & Alton	191,149	154,610	I. 36,539 23.7
Chi. & Northwest	372,800	418,900	D. 46,100 11.0
Chi. St. P. M. & Omaha	82,600	81,700	D. 900 0.9
Louisv. & Nash.	262,410	200,700	I. 1,710 0.6
Mil. L. S. W.	19,065	19,062	I. 3 0.0
Rochester & Pitts.	18,864	6,110	I. 12,754 209.7
St. L. & San F.	89,800	72,700	I. 17,100 23.5

Weekly reports of earnings are generally estimated in part, and are subject to correction by later statements.

Western Weighing Association.

During the month of February the Western Railway Weighing Association weighed 41,730 tons of cars of freight, against 32,640 cars during February, 1883, an increase of 8,090 cars, and against 38,357 cars during January, 1884, an increase of 3,382 cars. There are now 15 roads in the association.

Grain Movement.

For the week ending March 1 receipts and shipments of grain of all kinds at the eight reporting Northwestern markets and receipts at the seven Atlantic ports have been, in bushels, for the past eight years:

Year.	Northwestern receipts.	Northwestern shipments.	Atlantic receipts.
1877.....	1,500,598	1,041,102	2,719,769
1878.....	2,883,118	1,341,877	3,253,417
1879.....	2,945,233	1,743,635	4,307,569
1880.....	3,893,233	2,285,216	3,791,968
1881.....	3,757,601	1,564,359	3,456,497
1882.....	3,715,360	1,561,640	3,775,843
1883.....	5,531,960	4,101,322	4,565,927
1884.....	5,045,381	2,695,273	1,825,876

Thus the receipts of the Northwestern markets for the week were nearly 1,500,000 bushels less than in the corresponding week of last year, but much larger than in any previous year, and 347,000 bushels more than in the previous week of this year, and more than in any other week this year except one. The increase was almost entirely at St. Louis, whose receipts were 70 per cent. more than its average weekly receipts this year and larger than in any previous week since August last.

The shipments of these markets were nearly a third less than in the corresponding week of last year, but still were

larger than in any other year. They were a very little less than in the previous week of this year. Of this total 172,758 bushels went down the Mississippi.

The Atlantic receipts were 3,040,000 bushels (82½ per cent.) less than in the corresponding week of last year, and smaller than in any other year of the eight except 1882. They were also 295,000 bushels less than in the previous week of this year, yet little above the average since December. The decrease from the previous week was almost wholly at New Orleans. Baltimore and Portland received more than in any other week this year.

The exports from Atlantic ports for the week ending March 1 have been:

	1880.	1881.	1882.	1883.	1884.
Flour, bbls.	97,706	155,212	117,861	170,196	96,782
Grain, bu.	3,848,187	3,869,565	1,492,418	2,789,430	1,206,128

The exports thus were but half as great as last year, 740,000 bushels less than 1882, while the decrease from 1880 is 60 per cent., and from 1881 63½ per cent.

San Francisco exports for the eight months of the California crop year from July 1 to Feb. 29 were as follows, flour in barrels and wheat in bushels, flour being reduced to wheat in the totals:

	1883-84.	1882-83.	Inc. or Dec.	P. c.
Flour.....	885,793	716,602	I. 169,191	23.6
Wheat.....	14,383,945	20,351,120	D. 5,967,175	29.3
Total, bush.....	18,512,910	23,934,130	D. 5,121,220	21.4

Exports of barley from San Francisco by sea for the eight months were 146,062 cents, against 178,149 for the same period last year, a decrease of 32,087 cents, or 18.0 per cent. Rail shipments overlaid to Jan 31 (seven months) were 49,788 cents, against 8,617 cents in the previous year.

Colorado Rates.

In addition to the cuts heretofore made in Colorado rates the rate on salt in car-load, to Denver and other Colorado points from Chicago has been reduced to 50 cents per 100 lbs. Some efforts have been made by interested parties to secure a meeting to consider in relation to some arrangement of the restored rates, but the Chicago, Burlington & Quincy has so far declined to join in the movement and there is no prospect of any settlement of the difficulties at present.

Hoosac Tunnel Line.

The following circular from General Manager W. E. Everest is dated Buffalo, N. Y., March 1:

"Please send all car reports, showing the movements of Hoosac Tunnel Line cars, to C. W. Cushman, Manager of the Railway Car Association, Buffalo, N. Y. Blank and envelopes for this purpose will be furnished upon application to him."

Coal.

Anthracite coal tonnages for the two months ending March 1, as given by the weekly reports, were as follows, the tonnage given for each road being only that originating on the line to which it is credited:

	1884.	1883.	Inc. or Dec.	P. c.
Phila. & Reading	1,380,850	1,630,962	D. 250,112	11.9
Central of N. J.	43,673	8,263	I. 35,410	440.0
Del. & Hudson	146,544	83,074	I. 63,470	79.0
Lehigh Valley	811,260	817,818	D. 6,558	0.8
Pennsylvania & N. Y.	27,416	28,624	D. 1,208	4.2
Del. Lack. & West.	670,557	658,964	I. 11,593	1.7
Del. & Hud. Canal	467,772	519,523	D. 51,751	10.7
Penna. Coal Co.	141,633	174,076	D. 32,443	18.6
State Line & Sullivan	12,627	9,714	I. 2,913	30.0
Total anthracite.....	3,068,332	3,866,463	D. 798,131	24.4

The tonnage of the Central Railroad of New Jersey is this year included in the Philadelphia & Reading, no separate report being made.

The total tonnage reported to the corresponding date for eight years has been as follows:

1884.....	3,068,332	1880.....	3,273,493
1883.....	3,866,463	1879.....	3,395,082
1882.....	3,739,835	1878.....	2,308,990
1881.....	4,040,900	1877.....	2,279,210

The tonnage this year, limited as it has been by the short time agreement, is the smallest reported since 1880, although the reduction from 1882 is but trifling. The light production has not helped prices, however, and it is thought that the navigation season will open with lower prices than for two or three years past. It is reported that some large consumers have made contracts at very low rates.

Bituminous tonnages for the two months are reported as follows:

	1884.	1883.	Inc. or Dec.	P. c.
Barely R. R. & Coal Co.	40,025	41,026	D. 1,001	1.7
Huntingdon & Broad Top	30,808	39,018	D. 8,210	26.8
Cumberland, all lines	264,315	294,401	D. 30,086	10.6
Bellefonte & Snow Shoe	41,619	49,025	D. 7,406	15.1
Clearfield	436,816	460,640	D. 23,824	5.2
Mountain Region, Pa. R.R.	79,634	109,363	D. 29,729	37.2
West Penna. R. R.	61,031	88,273	D. 27,242	28.7
Southwest Penna. R. R.	27,558	24,006	I. 3,552	14.9
Penn and Westmoreland	210,111	241,850	D. 31,739	13.1
Monongahela R., Pa. R. R.	28,767	.....	.....	.....
Pittsburgh R., Pa. R. R.	45,815	90,190	D. 15,388	17.2
Total bituminous.....	1,288,587	1,457,720	D. 169,133	11.0

delivered at this port at \$3 to \$3.10 per ton, which is from 15 to 25 cents below the current rates charged for Clearfield coal."

Coal tonnage passing over the Pennsylvania & New York road for the three months of its fiscal year from Dec. 1 to March 1 was:

	1884.	1883.	Inc. or Dec.	P. c.
Anthracite.....	273,564	231,204	I. 42,360	18.3
Bituminous.....	85,022	87,580	D. 2,558	2.9

Total.....358,586 318,784 I. 39,802 12.4

The larger part of the anthracite is received from the Lehigh Valley road.

The coal produced from the mines controlled by the Union Pacific Co. for the year ending Dec. 31 was as follows:

	1883.	1882.	Increase.	P. c.
Sold by company.....	630,340	522,381	118,959	22.4
Sold to others.....	265,113	215,829	49,284	22.8

Total.....904,453 738,210 166,243 22.5

The average cost of coal delivered on cars at the mines was \$1.42½ per ton last year. The average price received for coal sold was \$4.71 per ton. The average haul on coal sold was 412 miles.

Cumberland coal shipments for the week ending March 8 were 35,927 tons. The total shipments this year to March 8 were 300,242 tons, against 335,623 tons to the corresponding date last year, a decrease of 35,381 tons, or 7.8 per cent.

Cotton.

Cotton movement for the week ending March 7 is reported as follows in bales:

	1884.	1883.	Inc. or Dec.	P. c.
Interior markets:				
Receipts.....	31,292	72,219	D. 40,927	56.8
Shipments.....	53,081	76,015	D. 22,934	30.2
Stock, March 7.....	205,477	304,621	D. 99,144	32.5
Seaports:				
Receipts.....	68,720	124,826	D. 56,106	44.9
Exports.....	108,852	128,198	D. 19,346	15.1
Stock, March 7.....	895,112	899,409	D. 4,297	0.5

The Commercial and Financial Chronicle gives a statement showing: "1. That the total receipts from the plantations since Sept. 1, 1883, were 4,578,645 bales; in 1882-83 were 5,314,676 bales; in 1881-82 were 4,387,783 bales.

"2. That, although the receipts at the out-ports the past week were 68,720 bales, the actual movement from plantations was only 46,932 bales, the balance being taken from the stocks at the interior towns. Last year the receipts from the plantations for the same week were 121,030 bales and for 1882 they were 81,648 bales."

The decrease in receipts now is due not only to the lighter crop, but also to the fact that there was this year a much earlier movement than last year.

Southern Freight Rates.

A general reduction has been made on the rates from New York to Chattanooga, Tenn., the rates being now as follows, per 100 lbs.: 1st class, 85; 2d class, 75; 3d class, 55; 4th class, 45; 5th class 36, and 6th class, 36 cents. The old rates were, for the different classes, \$1.18, \$1.01, 86, 73, 60 and 40 cents respectively. This reduction makes Chattanooga rates the same as those to Nashville.

A New Fast Mail Train.

A new fast mail train has been put on over the New York Central & Hudson River and the Lake Shore & Michigan Southern roads between New York and Chicago. It leaves New York at 8:50 p. m., reaching Buffalo at 9:35 a. m. (13 hours and 45 minutes), Toledo at 4:57 p. m. (20 hours, 7 minutes), and Chicago at 12:25 a. m., or in 27 hours, 35 minutes. As the distance by this route is 950 miles, the train must make an average speed of 35½ miles an hour, without allowance for stops. The train carries mail only, and no passengers.

Arrangements are being made to extend the fast service from Chicago to Omaha by the Chicago & Northwestern road.

Commissions on Ticket Sales.

The following circular from the Joint Executive Committee, Passenger Department, is dated March 1, and signed by Vice Chairman S. F. Pierson:

"The payment of commissions for the sale of tickets, especially when these commissions are paid to brokers or other irresponsible agents, is frequently made the basis for reduction in fare, which tends to disturb the harmonious relations between the companies represented on this Committee, and to demoralize rates.

"It is contrary to the wishes and practice of this Committee to pay commissions or other money considerations which are used to cut rates, and any and all parties with whom these companies interchange passenger business are requested to so far control commissions, or other money considerations paid by them to secure business, that payments shall not be used to reduce rates in the territory of this Committee."

RAILROAD LAW.

Tennessee Railroad Commission.

Under the law of last year creating this commission it was provided that it should have jurisdiction over all the railroads in operation, and it was made the duty of the Commission to procure a schedule of rates on what might seem to it a just basis. The Commission under this law prepared a tariff for each railroad in the state, and the Louisville & Nashville Co. began suit for a preliminary injunction to restrain the commission from enforcing it. The suit was brought in the United States Circuit Court, and a decision of that Court was given on Feb. 29. The Court holds the act unconstitutional because it is an attempt to regulate interstate commerce, a matter which is altogether within the control of Congress under the provisions of the Constitution of the United States. The Court also held that it violated the fourteenth amendment of the Constitution, as it was intended to regulate railroads alone, while other common carriers were not brought within the provisions of its terms. It further discriminated against corporations by providing that whenever they voted to confirm rates fixed by the commission they were to be held *prima facie* guilty of extortion, while an individual was to be presumed innocent of the same offense. This act was too indefinite, as it left the decision to the jury without any fixed law for their guidance, and further required a jury to decide questions upon an unnatural and illegal basis. It was also held that the law violated the state constitution because it prescribed a severer punishment against a corporation owner of a railroad than against an individual owner or partnership. The question of the vested right of the company to charge rates fixed by its charter was argued before the Court, but no decision was given on this point, the Court stating that there were so many questions already to determine that it was unnecessary to consider this.

This decision was on the preliminary injunction. The case will come up again for trial in the Circuit Court on the motion to make the injunction perpetual and in all probability will be carried up to the Supreme Court before a final decision is reached.

Carriers' Liability—Shippers' Valuation of Goods.

The case of Graves and others against the Lake Shore & Michigan Southern Co. in the Massachusetts Supreme Court was an action to recover for the loss of goods shipped from Peoria, Ill., for Boston. The defendants, as common carriers, received at Peoria 75 barrels of high wines, and agreed to deliver them to the plaintiffs at Boston. The bill of lading contained the stipulation that the goods were "shipped at an agreed valuation of \$20 per barrel, owners' risk of breakage." It also contained the agreement that "in the event of the loss of any property for which responsibility attaches under this bill of lading to the carriers, the value or cost of the same at the time and point of shipment is to govern the settlement, except the value of the articles has been agreed upon with the shipper, or is determined by the classification upon which the rates are based." The defendants had no knowledge of the value of the goods except that furnished by the statement of the shippers, and the charge for transportation was based upon this statement and valuation. The goods were destroyed during the transit by collision of two trains by the negligence of the servants of the defendants. The only question presented was whether the plaintiffs could recover any more than the agreed valuation of the goods. The Superior Court held that the plaintiffs could recover only the agreed valuation, and gave judgment for that amount, and the plaintiffs appealed. The Court has now affirmed the judgment, holding that the plaintiffs having represented and agreed that the goods carried were of the value of \$20 per barrel, and having thereby obtained a lower rate of compensation for the carriage, are estopped to show that the goods are of greater value. The Court, in the opinion, says: "The defendants have not attempted to defend themselves from liability for the negligence of their servants. They have made no contract for that purpose, but admit their responsibility. Their claim is that the plaintiffs, having represented and agreed that the goods are of a specific value, and having thus obtained the benefit of a diminished rate of transportation, are now estopped to in contradiction of their representation and agreement that the goods are of a greater value. It is the right of the carrier to require good faith on the part of those persons who deliver goods to be carried, or enter into contracts with him. The care to be exercised in transporting property and the reasonable compensation for its carriage depend largely on its nature and value, and such persons are bound to use no fraud or deception which would mislead him as to the extent of the duties or the risks which he assumes. If a person voluntarily represents and agrees that goods delivered to a carrier are of a certain value, and the carrier is thereby induced to grant him a reduced rate of compensation for the carriage, such person ought to be barred by his representation and agreement. The plaintiffs admit that their valuation of the goods would be conclusive against them in case of loss from any other cause except the negligence of the carriers or their servants, but contend that the contract does not fairly impart a stipulation of exemption from responsibility for such negligence. We cannot see the justice of this distinction. The plaintiffs voluntarily entered into the contract with the defendants. No advantage was taken of them. They voluntarily represented the value of the goods to be \$20 per barrel, and the compensation for carriage was fixed upon this value. We are of opinion that the plaintiffs are estopped to show that it was a greater valuation than that represented; that upon the facts of this case it was not competent for the plaintiffs to show that the value of the goods lost was greater than \$20 per barrel."

OLD AND NEW ROADS.

Atchison, Topeka & Santa Fe.—This company's amended and completed statement for December and the year ending Dec. 31 is as follows:

	A. T. & S. F.—	So. Kansas.—
December:	1883.	1882.
Earnings.....	\$1,105,817	\$1,458,439
Expenses.....	487,686	755,467
Net earnings....	\$618,131	\$703,172
Per cent. of exps. .	44.1	51.8
Year:		
Earnings.....	\$14,117,348	\$14,773,305
Expenses.....	6,388,759	8,326,961
Net earnings....	\$7,728,589	\$6,446,644
Per cent. of exps. .	45.3	56.4

The Atchison, Topeka & Santa Fe mileage for December was 1,820 miles in each year; for the year, 1,820 miles in 1883 and 1,815 in 1882. The Southern Kansas mileage for December was 398 miles in both years; for the year, 398 miles in 1883 and 393 in 1882.

In December, 1882, there was included in the Atchison, Topeka & Santa Fe receipts \$312,823 pool balances.

The Atchison Topeka & Santa Fe shows for the year a decrease of \$655,957, or 4.4 per cent., in gross earnings; a decrease of \$1,937,902, or 23.3 per cent., in expenses, and a gain in net earnings of \$1,281,945, or 19.9 per cent.

The Southern Kansas lines show for the year an increase of \$455,388, or 34.1 per cent., in gross earnings; an increase of \$168,879, or 26 per cent., in expenses, and a gain in net earnings of \$286,509, or 40.9 per cent.

The total gross earnings of both systems for 1883 were \$15,909,441; the expenses were \$7,603,853, and the net earnings \$8,305,608, which is \$88,749 more than the amount given in the statement published in January last, in which the earnings and expenses for December were partly estimated.

Baltimore & Ohio.—In the Court of Common Pleas in Philadelphia, March 11, a bill in equity was filed by the Schuylkill East Side Railroad Co., under whose charter the Baltimore & Ohio expects to enter Philadelphia and make connection with the Reading road. The bill was filed against the Pennsylvania Railroad Co., and sets forth that this company had obstructed the road-bed of the new road simply to prevent its construction and to interfere with the company in the exercise of its corporate rights. For that purpose a number of trestle works had been built across the line as located, ostensibly for the purpose of supporting a bridge. The complaint sets forth that unless these structures be removed it will be impossible to build the proposed road, and asks that the defendant be enjoined from maintaining them, and that it be ordered to remove these obstructions.

Boston & Albany.—The statement of the earnings for the quarter ending Dec. 31, 1883, made to the New York State Railroad Commission, is as follows:

Gross earnings.....	\$2,142,151
Operating expenses, excluding all taxes (88.8 per cent.)	1,903,217

Net earnings from operation.....\$238,934

This quarter covers the period of lightest receipts and heaviest expenses.

Boston Elevated.—A dispatch from Boston, March 12, says: "The Meigs elevated railroad bill has passed the Legislature. It nominally permits the construction, under

certain restrictions, of elevated railroads under the Meigs system through any of the towns or cities of the commonwealth, subject to the approval of the selectmen or aldermen, and specifically authorizes the building of an experimental section from Cambridge to Boston."

Burlington, Cedar Rapids & Northern.—At the recent annual meeting action was taken for the purpose of changing the articles of incorporation of this company, so as to permit the increase of the stock and bonded debt. The stock has been limited to \$10,000,000, but the change in the articles authorizes its increase to \$30,000,000, with a corresponding increase in the bonded debt. The principal object of this change is to provide means for the building of the proposed extensions of the road and also to substitute the consolidated bonds for the bonds heretofore issued upon the roads which are nominally leased but really owned by the company.

Canadian Pacific.—The bill authorizing the government to loan this company \$22,500,000, on terms already stated, has passed both houses of the Canadian Parliament.

It is now reported that the company will extend its line eastward to the maritime provinces in order to reach a winter terminus either at Halifax or St. John, instead of Portland or Boston. In extending the road eastward the existing lines will be used from Montreal to West Farnham, and from West Farnham to Sherbrooke, a line of 52 miles will be built. From Sherbrooke to the Maine line the International line is already completed. From thence it is proposed to build through Maine to Lincoln on the Maine Central, a distance of about 90 miles. From thence the Maine Central will be used to Vancorbore, and the New Brunswick Railway from Vancorbore to St. John's. To reach Halifax the proposed line leaves the New Brunswick road near Macadam Junction and runs through Fredericton to the Intercolonial near Moncton, requiring the building of about 100 miles of new road. There is also some talk of building a branch to Pictou.

Cape Fear & Yadkin Valley.—The track on this road is now laid to Buffalo Creek, N. C., about six miles southeast of Greensboro, S. C., and 92 miles from Fayetteville. At this point there will be some delay, as the track-layers will have to wait for the building of the bridge over the creek. The contracts for building all the stations on the new line have been let and work upon some of them has been begun. As soon as the track reaches Greensboro the force will be transferred to the Shoe Heel extension south of Fayetteville, in order to finish the tracklaying there as soon as possible.

Charleston & Savannah.—At the annual meeting in Charleston last week plans were submitted for a new iron bridge over the Ashley River and the board of directors were given authority to build the bridge.

Chicago, Burlington & Quincy.—This company on March 7 began to run its trains from Chicago through to Omaha instead of Council Bluffs. Trains cross the river on the Plattsmouth bridge and run up the west side into Omaha.

Chicago, Milwaukee & St. Paul.—The old suit of Barnes against this company, involving the validity of the foreclosure through which the La Crosse & Milwaukee road passed into the possession of the present company, and which was some time ago decided in the United States Circuit Court, will be carried to the Supreme Court on an appeal. This suit will involve several questions of much interest, but in the regular course of the Supreme Court business the case will not be reached for some time.

Chicago, Rock Island & Pacific.—In the New York Supreme Court, March 7, argument was heard on the motion in the suit of Holland Kennedy to compel the company to exhibit its stock book to him. The Court took the case under consideration on the first motion, which was to compel the exhibition of the transfer books and also of a list of the stockholders. The second motion was to compel the exhibition of the books alone, and if the law points were decided against the plaintiff on the first application no hearing will be had on the second.

Connoton Valley.—The Boston Herald of March 12 says: "The bondholders' and stockholders' committees will probably meet in a few days to arrange a plan of reorganization. The chairman of the latter committee, Judge Ranney, of Cleveland, is thoroughly informed on all matters pertaining to Ohio railroad law, and will be pretty certain to protect stockholders' rights. Three things appear to be tacitly agreed upon: That there shall be no assessment of the bonds; that the equity of the stock shall be preserved, and that a new mortgage for a small amount shall be created. The present bonds would become preferred stock."

Denver & Rio Grande.—This company has issued a circular in reply to that of the Colorado Coal & Iron Co., in which it says: "Regarding the oft-referred-to letter of Jan. 7, the facts are as follows: The President of this company during his investigations found that very large drawbacks were being paid and other concessions granted to your company on every branch of business conducted over its railway, some of which he considered very unjust. As an example, you were allowed in the month of January (on December vouchers) drawbacks amounting to \$5,029 on freight bills aggregating \$5,982. You will readily understand our President did not desire to transport any more of these supplies at such rates; hence his verbal instructions to the General Manager to discontinue these special rebates for the time, and until we could have a conference with your representative, which we have asked for without results. No allusion was made in the order to the coal or coke business, although the agents of your company made an attempt to distort its verbiage so as to cover every class of business, and so notified some of the largest customers of this road, with the hope, as we believe, of prejudicing them against our company; but the explanation that these misrepresentations called forth served to correct any wrong impressions.

"It has always been the intention of this company to adhere to the terms of these contracts, so far as it legally could, and such will be the policy of the present management. The statement that there has been no complaint from other shippers is untrue, as our executive officers have had innumerable charges of the favoritism extended toward your company, and it is a well-known fact that this feeling has worked much injury to our interest.

"The statement that because Gen. Palmer was the President of these various companies at the time the contracts were executed, therefore they are to be disregarded, is without the slightest foundation, since we are informed that Gen. Palmer's holdings in your company are infinitesimal, and therefore we cannot believe that his influence, should he desire to exert it to our disadvantage, would be regarded. The last part of your pamphlet, embracing copy of letter from a California house, stating what might have been done, is too far-fetched for our consideration. We agree with you that the interest of both our companies could best be served by harmonious action, and the practicing of a spirit of equity on both sides; which it has been our disposition to cultivate, and all we have desired to exact from your company. In this, we feel assured we have the support of the

entire disinterested public in the state through which we operate.

"In conclusion, we can but believe if the same energy had been displayed on the part of your officers in looking after the management of your company in the way of economies, etc., that has been exercised in trying to destroy the value of the very interest upon which you so much depend, that the results of your company would have been more satisfactory to its real owners."

There appears to be considerable personal feeling involved in the controversy, which will probably appear at the annual election for directors of this company.

This company's statement for January is as follows:

Gross earnings.....	\$487,291
Expenses (85 per cent.).....	415,066
Net earnings.....	\$72,225

In January, 1883, the net earnings were \$118,608, showing a decrease this year of \$46,383, or 39.1 per cent. The statement says: "Cut rates to Utah points prevailed nearly the whole month. Snow blockades interfered seriously with business, and have continued through February."

The company has ceased to publish its earnings weekly, and will hereafter give out only the completed monthly statement showing gross and net earnings.

Duluth, Fargo & Black Hills.—This company has been organized to build a railroad from Fargo, Dak., southwest to the Missouri River near Fort James, and thence in as direct a line as possible to the Black Hills. It is said that work will be begun at once on the first section of 50 miles.

East Tennessee, Virginia & Georgia.—It is reported that negotiations are in progress for the lease or sale to this company of the lines now owned by the Alabama, New Orleans, Texas & Pacific Junction Co., which include the Alabama Great Southern, the New Orleans & Northeastern, the Vicksburg & Meridian, and the Vicksburg, Shreveport & Pacific companies and also a controlling interest in the Cincinnati, New Orleans & Texas Pacific Company, lessee of the Cincinnati Southern road. A committee of the East Tennessee board has gone to London for the purpose of negotiating the lease with the company above named, which is an English organization.

Elmira, Cortland & Northern.—This company has been organized by the bondholders who purchased the Utica, Ithaca & Elmira road at foreclosure sale. The capital stock of the new company is \$2,000,000, and it will have no bonded debt. The Cazenovia & Canastota, which was leased by the old company, will be consolidated with the new organization. The line runs from Elmira, N. Y., to Canastota, about 120 miles in all.

Florida Midland & Georgia.—Work on this road was begun on March 6 at Valdosta, Ga., and grading is now in progress with a considerable force. The road is to run from Valdosta southeast to Live Oak, Fla., and thence southward.

Fort Smith & Sabine Pass.—This company has filed articles of incorporation to build a railroad from Fort Smith, Ark., southward to Texarkana, about 160 miles, with the privilege of extension to Sabine Pass. The capital stock is placed at \$4,000,000.

Gainesville, Jefferson & Southern.—This road, which will soon connect Gainesville, Ga., with the Georgia Railroad at Social Circle, has now passed entirely under the management of the Georgia road, and will be controlled by the officers of that road.

Gettysburg & Harrisburg.—The last spike on this road was driven with much ceremony at a point about 1½ miles north of the terminus in Gettysburg, Pa., the officers of the company and a number of railroad men and other invited guests being present. The road leaves the South Mountain Railroad at Hunter's Run, and runs in a general southward direction to Gettysburg, 22 miles. It runs through a broken and hilly country and has many curves. From Hunter's Run to the summit the maximum grade is 85 ft. to the mile and from thence the line continues to Gettysburg with more moderate grades. The leveling up and ballasting of the road is now in progress, and it is expected that the road will be opened for traffic and regular trains put on early in April. The construction of the road has been mainly due to Col. J. C. Fuller, of Pine Grove Furnace, President, and Mr. Jay Cooke, who is a director of the company. It will be operated in connection with the Cumberland Valley road and trains will be run through from Harrisburg to Gettysburg.

Greensburg & Madison.—It is proposed to build a railroad from Greensburg, Ind., southeast through Osgood to Versailles and thence southward to Madison, about 45 miles in all. Some of the towns on the line have already voted a tax for its aid and others are expected to take the same action.

Jacksonville, Tampa & Key West.—The track on this road is reported laid to Palatka, Fla., 27 miles southward of the late terminus at Green Cove Springs and 55 miles from Jacksonville. The road follows nearly the west bank of the St. Johns River, and is of 3 ft. gauge. It connects at Palatka with the South Florida road, with which it makes a through line from Jacksonville to Tampa. The road will be opened for traffic about the close of the present month.

Kentucky Central.—A dispatch from Cincinnati says that one of the largest stockholders refused to pay the 10 per cent. assessment recently ordered. It is thought that in consequence of this the plan of paying off the floating debt of the road and completing its extension by an assessment of the stockholders, and the reduction of interest upon the bonds from 6 to 4 per cent., for a period of three years, is likely to fail. This plan had been agreed upon by nearly all the holders of securities but it may be defeated by the refusal of the few. It is further reported that some of the creditors are growing urgent in pressing their claims, and an application for a receivership is talked of, but not very probable.

Lake Shore & Michigan Southern.—A statement has been published by the New York Tribune giving the earnings and expenses for 1883, which is claimed to be correct, although not coming from official sources. This statement is given below, comparison being made with the figures taken from the company's report for 1882, the receipts from interest on investments in that year being included in gross earnings:

	1883.	1882.	Inc. or Dec.	P. c.
Earnings.....	\$18,553,289	\$18,324,031	I.	\$229,258 1.3
Expenses.....	11,101,676	11,057,807	I.	43,869 0.4
Net earnings.....	\$7,451,613	\$7,266,224	I.	\$185,389 2.6
Interest and rentals	3,514,863	3,072,042	I.	442,821 14.4
Surplus.....	\$3,936,750	\$4,194,182	D.	\$257,432 6.1
Dividends.....	4,010,670	4,010,670	.....	.....
Surplus or deficit.....	\$73,920	\$183,512	.....	.....

The yearly payment of \$250,000 to the sinking fund would increase the deficit for last year to \$223,920. It will be understood that these figures are not vouched for officially.

Lehigh & Wilkesbarre Coal Co.—At the annual meeting last week the following statement was submitted: Coal production, 3,245,000, and additional tons purchased, 93,000. Of this amount 1,530,000 tons were shipped to Port Johnston, and the remainder to points on the Reading road. The amount expended for improvements and charged to expenses was \$275,000. The mortgage debt was reduced \$406,000 (exclusive of \$34,000 deposited for redemption of bonds). Of \$500,000 five-year mortgage bonds which matured July 1, \$200,000 have been extended four years and sinking funds continued for the redemption of the same. The company paid interest on incomes during the year, and 2½ per cent. on \$6,116,000 consolidated bonds held by the New Jersey Central Railroad. No definite action has yet been taken regarding the proposition to lease the property to the Reading.

Long Island.—This company's statement for the first quarter of its fiscal year, from Oct. 1 to Dec. 31, is as follows:

Gross earnings.....	\$551,841
Expenses (80.55 per cent.).....	444,497
Net earnings.....	\$107,344
Income from other sources.....	14,874
Total.....	\$122,218

Interest.....	\$99,402
Rentals.....	83,859
Taxes.....	17,400
Total.....	200,721

Deficit for the quarter.....	\$78,503
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This statement covers very nearly the period of lightest business on this road. The net earnings for the quarter were only 10.7 per cent. of the net earnings for the year ending Sept. 30 last.

Louisville & Nashville.—The bridge over the Ohio River at Henderson, Ky., is to be completed, a syndicate having taken the \$2,000,000 bonds of the Henderson Bridge Co., to provide the funds for that purpose. The Louisville & Nashville Railroad Co., the Southeast & St. Louis Railway Co., the Evansville & Terre Haute Railroad Co., the Peoria, Decatur & Evansville Railway Co., and the Louisville, Evansville & St. Louis Railway Co. have entered into a traffic agreement with the Henderson Bridge Co. for 99 years. The traffic of the several companies named, between the cities of Henderson, Ky., and Evansville, Ind., which is now done by ferry transfer of 10 miles will, it is expected, be greatly increased when the bridge is completed, making the railroad connection continuous and direct from St. Louis and Chicago to Nashville and points south of that city.

The masonry work of the bridge has been under way for a year past, and is nearly completed, the Louisville & Nashville Co. advancing to the bridge company the necessary funds. The superstructure has been contracted for, and is to be completed and the bridge opened to traffic in December of this year.

The bridge is to be 53 ft. above high-water mark, complying with the requirements of the Federal law, and avoiding the necessity of a draw.

Maine Railroads.—From the twenty-fifth yearly report of the Railroad Commissioners of Maine it appears that there are 37 railroads in that state, including branch lines, and three horse railroads. Nine of these roads are managed by the Maine Central and three by the Grand Trunk, so that, practically, the number of railroads is much smaller. There are 1079.52 miles of railroad in Maine. The mileage has been increased but little the past year—26¼ miles by the construction of the Bridgton & Saco, the Green Mountain, the Kennebunk & Kennebunkport and the Monson railroads—but the following are in process of construction: Bangor & Piscataquis, from Blanchard to Moosehead Lake, 13.9 miles; Mt. Desert Branch of Maine Central, 40 miles; International & Megantic railway from Knoxville, Can., via Lake Megantic and Moosehead Lake, to a connection with the European & North American Railway at or near Mattawamkeag. The state has been remarkably free from accidents the past year. It is noticeable that of 38 slight accidents a large majority, 28, have happened on railroads lying partly outside the state, the Grand and the Boston & Maine. An important suggestion in relation to starting new roads is made by the Commissioners—that is, that railroad corporations should not be obliged by law to make a large expenditure for an actual survey, plans, specifications, etc., before the question as to whether public convenience requires the construction of such a road has been determined by the Railroad Commissioners. Under the provisions of the law as it now exists considerable capital has been sunk in Maine the past year.

Meherrin Valley.—This road was last year completed from a junction with the Seaboard & Roanoke at Margaretsville, N. C., northwest to Warren, Va., 4 miles. The grading is now very nearly completed to Hicksford, on the Petersburg road, 16 miles northwest of Warren, and track-laying will soon be begun.

Mexican Central.—A dispatch from Fresnillo, Mexico, March 8, says: "The final spike in the Mexican Central Railroad was driven to-day on a broad plane six miles from Fresnillo, at 4:50 in the afternoon, in the presence of a distinguished assemblage. There is now an unbroken railroad from Mexico City to the Rio Grande. Much enthusiasm was displayed, and General Manager Robinson was warmly congratulated. The final spike was driven by Mr. Buckner, Master Tracklayer. The two locomotives, one from Mexico City and the other from the United States, decorated with the Mexican and American colors, approached until the cow-catchers met. Great energy has been displayed in the track laying. For the last three days 3¼ miles were laid daily; 73 miles were laid during the 26 working days in February, and 525 miles in the last 12 months. The road will be opened for through traffic immediately. The first train will leave Mexico City next week."

The main line, which is the first completed line from the United States to the city of Mexico, is 1,225 miles long, from Paso del Norte to Mexico. Arrangements are already completed for the running of through trains and the sale of through tickets.

Mexican Railroad Notes.—The following notes are from the Mexican Financier of Feb. 23:

The Puebla & San Martin Texmexican Railway carried 12,428 passengers in January.

The street railway under construction in Zacatecas to the station of the Mexican Central is making good progress. It ascends a hill so steep that it will be difficult to operate it by animal traction except at great expense. It would be advisable to introduce the cable system upon a tramway of that kind.

The state of Sinaloa has granted a subsidy of \$2,000 a kilometer to the line for which Gen. Carbó has a concession from Mazatlan through Rosario to a junction with the Pacific Division of the Mexican Central. This line is handsomely subsidized now, and with the subventions from the

federal government, the state, and the cities of Mazatlan and Rosario, and with the traffic assured it, it ought to be a profitable railway to build.

New Castle Northern.—Arguments were heard in Pittsburgh, March 7, on the motion to make perpetual the temporary injunction restraining Thomas Simpson from proceeding with work on the road under the contract made with the Negley board of directors. The claim is that that board is not the legal board of directors of the company, and also that the contract price was more than double the amount of the capital stock, which in itself would make the contract illegal.

New Jersey Railroad Taxation.—The bill introduced by the Joint Committee for the taxation of railroads in the New Jersey Legislature was to some extent modified by a later bill, which was introduced as a compromise. This compromise bill has passed the Assembly, and is now before the Senate. The Senate Committee on Railroads has been occupied this week in hearing arguments for and against the bill, and will probably continue the hearing all of the present week.

New York & New England.—The decision of Judge Shipman in the matter of the receivership of this road which was filed March 7, reviews in detail the circumstances existing at the time of the application and holds that they justified the appointment of a receiver. The motion to dissolve the receivership was denied.

After speaking of the financial condition of the road, which made a receivership inevitable, Judge Shipman says: "The question still remains, was the institution of the suit and the efforts on the part of the directors to promote it an attempted fraud upon any one? I have carefully listened to the facts and suggestions and inferences which have been stated by the counsel for the petitioners, and I can discover no actual trace of a desire to injure the property or securities or the honest and true character of the company. I see circumstances which a mind predisposed to suspicion can easily fasten upon as indicative of a sinister and indirect motive. I am at a loss to find where the fraud exists when the pecuniary condition of the company is really understood. If the directors had in mind the wreckage of the road they would have done it easily by not favoring a receivership. I am of the opinion that when a railroad corporation, with its well-known obligations to the public, has become entirely insolvent and unable to pay the interest upon its secured debts, unable to pay its floating debt, unable to pay the sums due its connecting lines, unable to borrow money and in peril of the breaking up and destruction of its business and confesses this inability, although no default has as yet taken place upon the securities owned by the orator, but a default is eminent and manifest, a case has arisen whereupon a bill for an injunction against attacks upon the mortgaged property and a receivership to protect the property of the corporation against peril, a temporary receiver may properly and wisely be appointed."

"It was next said that this was a case of collusion between the orator and the railroad corporation. There is no claim that there was any collusion on the part of the second-mortgage trustees. If by collusion it is meant that the preparation for and institution of the suit were known and desired by the directors or some of them, in the belief that the granting of the prayer of the bill would be prudent and wise, then it was collusion. If by collusion it is meant that the institution of the suit or its management was marked by fraudulent design or purpose, then there was not collusion. In regard to the prayer of the petition for the removal of the Receiver, no adequate reason has, in my opinion, been given for such a course. The affidavits of the second-mortgage trustees contain a sufficient reason why such a prayer should be denied. In regard to the prayer of the petition for the appointment of a co-receiver, I see no reason for antagonistic receivers, and a receiver who should be in accord with Mr. Clark would not probably be satisfactory to the petitioners."

New York, Pennsylvania & Ohio.—In the Court of Common Pleas in Cleveland, O., March 8, a decision was rendered in the action brought by James McHenry to enjoin the directors of this company from any further issue of bonds in place of the deferred interest warrants issued for interest on the first-mortgage bonds. The Court held that while McHenry was the owner of certificates entitling him to a large amount of common stock and third-mortgage bonds, and was perhaps a creditor of the road to a certain extent, yet the aggregate amount of liabilities was so far in excess of the real value of the road, and so much greater than any sum which can be realized by or from the road, that his claim is really worthless, and only a nominal interest is represented by these securities. The issue of bonds in exchange for deferred interest warrants would neither increase the debt nor change its character as a first lien on the property, and therefore no considerable harm would be inflicted on the plaintiff. An injunction, however, if granted would tend to diminish the price of the first-mortgage bonds which might be supposed to have some value. The motion was therefore overruled and the temporary injunction denied.

North Carolina Lumber Roads.—The Raleigh News and Observer adds to its list of private and lumbering roads in North Carolina, which we copied a few weeks ago, the following additional lines which have been reported:

Bogue.—This road runs from Bogue station on the Wilmington, Columbia & Augusta road southward 8 miles into the pine woods. It is of standard gauge and used for hauling lumber and naval stores.

Cape Fear & Atlantic.—This road is a short branch 2 miles long and of standard gauge, running from the Wilmington & Weldon road in New Hanover County. It is owned by the firm of Ross & Lara, and will be extended as the business of the firm requires.

Cold Spring & Hamburg.—This road is a lumber road running from Blue's Crossing on the Raleigh & Augusta Air Line, where there are large mills, 3 miles into the woods. It is 38-inch gauge, and is used entirely for hauling lumber. It will be extended as business requires.

Dawson.—This road, concerning which information was asked, has been found. It starts from Dawson Landing on the Cape Fear River in Bladen County, and runs back 10 miles into what is locally known as the Isaac Wright timber tract. It is owned by Mr. A. Y. Wilson, of Wilmington, N. C. It is the oldest of the North Carolina lumber roads, having been in operation about 15 years.

Ocean City.—This company receives this week bids for the construction of its road from the terminus of a branch of a West Jersey road at Sea Isle, N. J., along Ludlum's and Peck's beaches to Ocean City, a distance of 10½ miles. The work includes pile bridges over Corson Inlet, the Thoroughfare and Weakfish Creek, about 3,700 ft. in all. Surveys for the road were made by the engineers of the West Jersey Company.

Ohio Central.—The questions depending upon the appointment of Mr. Thomas R. Sharp as Receiver of the River Division will come up for trial before the United States Circuit Court at Wheeling, W. Va., March 15. The

case involves a conflict of jurisdiction between the circuit courts for West Virginia and Ohio.

Oregon Improvement Co.—This company's statement for the month of January is as follows:

	1884.	1883.	Increase.	P. c.
Earnings.....	\$234,192	\$234,506	\$25,636	10.7
Expenses.....	215,824	196,534	19,290	9.8
Net earnings.....	\$48,368	\$41,972	\$6,396	15.2

This statement covers the operation of all the departments of the company.

Oregon Railway & Navigation Co.—A dispatch from Portland, Ore., says that the United States Circuit Court in that city has decided that the Oregon mortgage tax law is unconstitutional. This decision, if sustained, will remove the difficulties which have heretofore prevented the execution of the proposed consolidated mortgage on this company's property.

Oregon & Transcontinental Co.—The *Commercial and Financial Chronicle* says: "A legal opinion has been given as to the liability of stockholders in this corporation, which may be condensed as follows: When this stock was originally issued in 1881, the subscribers paid in only 83 per cent. of the par value of each share, although they received certificates stating that each share had been fully paid up. It appears that 17 per cent. of the nominal capital has never been paid into the treasury of the company, and that, under the constitution and laws of Oregon, under which the company was organized, the holders of stock are liable to the creditors to the extent unpaid upon each share."

"The Supreme Court of Oregon has held the liability to the creditor to be in the following order: First, the corporation must be exhausted; second, the last holder of the stock, if he be solvent, and, third, the prior holder to the extent of debts existing when he held."

"On questions of technical law, such as this, it is desirable to have an opinion on both sides."

Pennsylvania.—Surveys are being made for an extension of the Ebensburg & Cresson Branch from Ebensburg, Pa., southwest along the Blacklick Creek. This extension will open up a rich mineral district, and will be about 30 miles long.

During the past year improvements on the line of the New York Division have made considerable progress. There are now four tracks in use from the bridge on the Connecting Railroad in Philadelphia to Germantown Junction, and a good deal of work has been done beyond the latter point, so much so that it is expected that the four tracks will be in use as far as Holmesburg Junction in another month. At Frankford the old wooden bridge has been abandoned, and trains are now running over a brick and stone arch bridge, which has been made wide enough for five tracks. From Holmesburg Junction to Frankford four tracks are in use, and the line has been straightened, taking out two or three sharp curves. From Schenks through Bristol to Bustleton, the four tracks have been completed. Through Bristol the line has been straightened, and the old tracks are now used as sidings. More tracks have been laid in the Trenton yard for the passage of slow freight trains, and several additional sidings have also been put in use at Monmouth Junction. The third and fourth tracks are in use from Metuchen to New Brunswick and work is in progress between Metuchen and Menlo Park, where the line is straightened, the old reversed curve near Metuchen being taken out. From Menlo Park to Perth Amboy Junction the third and fourth tracks have been in use since last spring, completing a continuous four track system from Menlo Park to Jersey City, excepting one mile through Elizabeth and short distances at the Passaic and Hackensack bridges and about a mile in the Bergen Cut. The engine house and storage yard formerly at Newark have been removed to Waverley, and the Newark local trains now run to that station. The new yard there and the one at Emmett street in Newark, occupying the ground where the engine house formerly stood, will avoid the use of the third and fourth tracks through Newark for storing and unloading cars. The new bridge over the Hackensack which carries the two additional tracks, making a separate and straighter line which will be used for passenger trains, is also completed with the exception of the draw-span which will be in position in a short time. Not much work is now being done in the Bergen Cut, the work of widening and straightening progressing only as fast as the stone can be used for ballast. The work, however, will soon be finished even at this rate, as there is only a short piece remaining to be done. Not much will be done this year on the third and fourth tracks excepting through Elizabeth. Property has been purchased for the right of way, and the additional tracks will be laid in each direction close up to the crossing of the Central Railroad. The old station at Trenton will shortly be removed and a new station built there which will be over the tracks and on a level with the street.

At the annual meeting in Philadelphia, March 11, as reported by the *Ledger*, quite a number of questions were asked of the President, principally by one stockholder, who was on his feet during nearly the whole of the session. In answer to a question as to whether the Adams Express Co. has its freight carried over any line of the Pennsylvania Railroad at a price about or less than pig iron is carried, President Roberts replied, "Neither less or about." A question as to the action of the company in requesting the proxies of English shareholders and in paying the expenses incidental thereto, having been asked, Mr. Roberts remarked that by the charter the management were obliged to secure as large a vote as possible at the annual elections, and that in all cases the proxies were voted in accordance with the expressed wish of the stockholders sending them.

When the statement of the general income account was reached a query was made as to what is done where transporters are entitled to a rebate—whether it is charged back and taken from the profit and loss account, and whether secret rebates are paid out of this fund, which is shown to be, for 1883, \$2,021,997, the interrogator assuming that these are secret rebates? President Roberts simply replied in the negative.

Mr. Edward T. Parker said that he was so heartily in accord with the report that he had very few questions to ask, but he would like to ask relative to the statement in the report about "the policy of giving the shareholders the option of converting a portion of their dividends into stock, and of making an additional allotment of shares at par," exactly what the directors meant by saying "your board are satisfied that it would be to the best interests of the shareholders to continue the practice of paying limited cash dividends and such extra dividends, convertible into stock, as the profits of the company may from time to time warrant." President Roberts replied that it simply meant the paying of dividends partly in cash and partly in stock, and Mr. Parker added that he only objected especially to the use of the word "limited."

When the portion of the report relative to the car trusts was reached several questions were asked relative to them, in reply to which Mr. Roberts said that, under the terms of

the trust, the company is obliged to perpetuate and keep up the cars in the same condition at the end of the trust as the beginning. One of these cars, therefore, if reconstructed as soon as demolished, might be said to last forever. If a car is destroyed and has to be rebuilt the expense is charged to the item for maintenance of cars in the expense account.

Then a question was specifically asked, whether it was true that coal is transported by the Pennsylvania Railroad for some parties at 1½ cents per ton per mile, where others pay 3 cents.

Mr. Roberts replied: "The Pennsylvania Railroad Co. manages its traffic business with just equity to all and never charges one man more than another under like circumstances."

In answer to a call for information as to the securities of the Chicago, St. Louis & Pittsburgh Railroad Co. Mr. Roberts said that they had been paid for. The cost is stated in the balance sheets of the company, but it was not deemed wise to put it in the report, as it would be made use of by parties who have not the interest of the company at heart.

The report stated that the pooling arrangements between the trunk lines, while to a certain extent protecting the revenues on through traffic, have not yielded the full benefit that was anticipated when they were made, and that the Board "are satisfied that the requisite stability cannot be attained until more efficacious means are provided to enforce the agreements made between competing lines; and, unless this is done, it is doubtful whether the interests of the company will be promoted by a further continuance of the imperfect arrangements that now exist." President Roberts said, in answer to a question as to whether this meant that the pooling arrangement was to be broken, that "it has not been the practice of the company to break any of its contracts at all."

Relative to the report of the managers of the Trust Fund, Mr. Gaskill inquired what benefit the trust would be to the present generation of stockholders. Mr. Roberts said that it tended to strengthen the credit of the company, and that the interest received is now largely in excess of that which the company is required to pay.

Lewis Elkins then offered the following resolutions:

"Resolved, That the report of the President and Board of Directors for the year 1883 be adopted and approved, and that the incoming board of directors are hereby authorized to carry into effect the recommendations made therein."

"Resolved, That the thanks of the stockholders be tendered the President and board of directors for their able and faithful management of the affairs of the company during the past year."

"Resolved, That the policy in the payment of dividends as indicated in the report be approved, and the board be authorized to continue the same whenever, in their judgment, it shall be for the best interests of the shareholders of the company to do so."

The first two resolutions were adopted unanimously and without debate, but Mr. Parker offered the following as an amendment to the third resolution:

"Resolved, That the stockholders, in annual meeting assembled, do most heartily concur in the statement of principles—that all net earnings used for construction or betterments properly belong to capital account—and in our judgment the same should be adopted, and announced by the board of directors as the fixed policy of this company, and that hereafter all net earnings so used shall be restored to the stockholders in an extra stock dividend."

After some debate, Mr. Parker's resolution was withdrawn, and the original was adopted.

The Parker resolution was reintroduced, and its author thought that if it was adopted and the fixed policy of the company asserted it would make a difference of from \$3 to \$5 to the stock in the market. Upon motion the subject was laid on the table.

Mr. Gaskill's resolution for the continuance of the trust fund as a special reserve fund for the maintenance of a regular 8 per cent. dividend, on motion of Mr. Steinmetz, was indefinitely postponed.

The customary resolution was passed providing for a committee of the stockholders to prepare, after conference with the President, a ticket for directors to be voted at the next annual meeting.

Mr. William E. Lockwood introduced a resolution declaring that the Pullman Palace Car Co., the Adams Express Co., and the Western Union Telegraph Co. were usurping the rights of the stockholders and absorbing profits which should go to them, and asserting that the entire express, palace car and telegraph business should be controlled by the directors to the end that the profits shall go to the stockholders. The resolution provided for a committee of five stockholders to investigate the subject, reporting to the directors and to a subsequent meeting of the stockholders.

No action was taken on this resolution, as a motion to adjourn was made and carried immediately after it had been presented.

Philadelphia & Reading.—Arrangements are being made for widening the cuts along the Lebanon Valley Branch for a second track. There is already a second track on part of the line which is to be extended over the whole branch from Reading to Harrisburg. This work is being done in anticipation of additional business expected from the completion of the South Pennsylvania Railroad.

Richmond & Alleghany.—The first-mortgage bondholders of this road have prepared a document protesting against the plan of reorganization proposed by the officers, which requires absolute surrender of half the coupons for four years, aggregating \$700,000. The new plan represents that the property is worth more than the first-mortgage bonds. The bondholders propose that the company pay one-half the coupons, fund the other half, and that scrip be issued for the coupons so funded at the rate of \$140 for each \$1,000 bond—scrip to carry 5 per cent. interest. Principal and interest are to be payable prior to any payment of dividends on preferred or common stock. The old plan, they claim, is in the interest of second-mortgage bondholders, who would receive preferred stock for their bonds, and after the first-mortgage bondholders had surrendered their coupons for several years without any equivalent, the holders of preferred stock might be drawing dividends.

Richmond & Danville.—The bill authorizing the consolidation of the Virginia Midland road with this company has been defeated in the Virginia Senate. The opposition to it was entirely local, and had its origin in the fear of the Richmond people that much of the business of the road might be diverted to Baltimore.

Rogersville & Jefferson.—Arrangements are being made to extend this road from its present terminus at Rogersville, Tenn., northward about 30 miles to Jonesboro in Lee County, Va. It will run through a country where coal beds are known to exist and are believed to be valuable. The road now extends from Rogersville Junction, on the East Tennessee, Virginia & Georgia road, to Rogersville, 16 miles.

San Francisco & Clear Lake.—This company has filed articles of incorporation to build a railroad from Clear Lake, in Napa County, Cal., to a point on San Francisco Bay. The distance is about 75 miles.

Savannah, Florida & Western.—At the annual meeting in Savannah last week an agreement was approved for the consolidation with the company of the Waycross & Florida, the East Florida, the Live Oak & Rowland's Bluff, the Chattahoochee & East Pass, and the Live Oak, Tampa & Charlotte Harbor companies. The Waycross & Florida and the East Florida companies own the line from Waycross to Jacksonville. The Live Oak & Rowland's Bluff owns the line between the two places named, and the Chattahoochee & East Pass owns the branch from Climax to Chattahoochee. The Charlotte Harbor Co. is now engaged in building an extension of the branch to Rowland's Bluff. All these companies are owned substantially and controlled by the Savannah, Florida & Western. Under the agreement as approved the name of the consolidated company will remain as now, and its stock will be issued for the stock of the controlled companies. The consolidated company will also assume all the debts of these companies.

The extension of this company's Florida Division, built under the charter of the Live Oak, Tampa & Charlotte Harbor Co., is now completed from Rowland's Bluff, Fla., east by south to Newnansville, 83 miles, and trains are running to the last named point. The extension is further graded about 12 miles, leaving only four miles to complete the grading to Gainesville, and the track-laying is also in progress. From Gainesville the line is to run nearly due south to Tampa.

Scioto Valley.—A circular from this company says: "The freight and passenger cars of this company are numbered and lettered as follows: Coaches, Nos. 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 15, 16 and 17; baggage cars, Nos. 1, 5, 13 and 14; box cars, Nos. 1 to 200 and 301 to 400, inclusive; also Nos. 1102 to 1134, even numbers inclusive, these 17 cars being in the Kanawha Dispatch line; flats and gondolas, Nos. 201 to 225 and 530 to 679 inclusive; stock cars, Nos. 1201 to 1220 inclusive; caboose cars, Nos. 1, 2, 3, 4, 5 and 6."

"Cars of this company are lettered 'Scioto Valley' and 'Scioto Valley R'y.' Cars should be taken not to confound them with cars of other roads, which are marked 'S. V. R'y' or 'S. V. R. R.'"

Securities on the New York Stock Exchange.—The Governing Committee has placed the following securities on the lists at the Stock Exchange:

Buffalo, New York & Philadelphia, \$1,700,000 new general mortgage bonds.

Chicago, St. Paul, Minneapolis & Omaha, \$1,062,000 additional general mortgage bonds.

New York, Lackawanna & Western, \$5,000,000 construction (second) mortgage bonds.

Northern Pacific, \$1,250,000 additional general first-mortgage bonds.

Sharpsville.—Some time ago this company made a contract by which it was to receive from the New York, Pennsylvania & Ohio iron ore, coal, etc., and to deliver them to furnaces at a fixed rate of 75 cents per car. It was stipulated that this contract should expire at any time on 90 days' notice. Last week the Sharpsville Co. gave notice of a close of the contract, and also notified that it would hereafter charge \$2 per car load instead of 75 cents for transferring the cars to the furnaces. This action was taken because the New York, Pennsylvania & Ohio had made arrangements to build a line of its own to Sharpsville from some of the principal furnaces. The new line, however, crosses the right of way of the Sharpsville road, and that company has secured an injunction against its construction.

Toledo, Cincinnati & St. Louis.—In Cincinnati, March 11, a petition was filed in the United States Circuit Court, asking the Court to set aside the recent decree awarding \$110,000 to the builders who furnished locomotives to the road. The decree was against the Cincinnati Northern and the Dayton & Northeastern divisions of the road. The petition represents that as these locomotives were ordered for and used upon the entire road it is a hardship for the bondholders of these two divisions to be required to pay the entire amount. The Court intimated that the point at issue was an important one and took it under advisement.

Union Pacific.—The tunnel of the Oregon Short Line at Hodges Pass has been completed and track is now being laid through it. This tunnel pierces the Uintah range of mountains near Twin Creek station, about 30 miles southwest of the junction of the main line at Granger, Wyoming. It is 1,400 ft. long and was begun in May last year. The approach to the tunnel is covered by snow-sheds at each end for about 1,000 ft. Trains have hitherto been carried over the mountain at this point on a switch-back with very heavy grades.

The land sales of this company for February were 173,598 acres for \$418,857, an average of \$2.41 per acre. In the corresponding month last year the sales were 42,620 acres for \$137,902, an average of \$3.23 per acre.

Western Union Telegraph.—At a meeting of the board held March 12 the following statement was submitted for the quarter ending March 31, the February and March receipts being estimated:

Surplus, Jan. 1 \$3,970,932

Net earnings for the quarter 1,650,000

Total \$5,620,932

Interest on bonds \$108,421

Sinking funds 20,000

Balance, surplus \$5,492,511

It was resolved to declare the usual quarterly dividend of 1½ per cent., the payment of which will require \$1,399,800, leaving a balance of \$4,092,711 on hand.

Wheeling & Harrisburg.—The Elm Grove & State Line Railroad Co., a subordinate corporation, has been consolidated with this company. The road which the consolidated company purposes building is to run from Wheeling, W. Va., to a connection with the South Pennsylvania road near Connelville, Pa., and the company also proposes building a bridge over the Ohio River at Wheeling.

Wisconsin Central.—The St. Paul *Pioneer Press* says that General Manager Pinney on this road was last week in St. Paul in consultation with officers of the St. Paul & Duluth and the St. Paul, Minneapolis & Manitoba companies, his object being to make contracts for the entrance into St. Paul and station accommodations in that city for the new extension of the Wisconsin Central road. The matter was not finally determined, but it is pretty well settled that the road will enter St. Paul over one of the lines named and will not extend its own track into the city. The new extension of the road is finally located. It leaves the main line at Chippewa Falls, Wis., and will cross the St. Croix River above Stillwater. It is about 100 miles long, and for much of the distance will be generally parallel with the Chicago, St. Paul, Minneapolis & Omaha main line about from ten to fifteen miles north of it. For nearly the whole distance it runs through a timber district still comparatively untouched. It is intended to begin work as early in the spring as possible.